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CLIMATOLOGICAL DATA FOR THE WEST INDIAN ISLANDS

551.58 (729)

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[Prepared under the direction of the Chief of Climatological Division, Weather Bureau, Washington, D. C.]

The meteorological data for this region are found in publications such as the Jamaica Weather Report, containing records for entire island areas, in the *in extenso* reports issued by important observatories such as *Colegio de Belen* at Habana and *Montserrat* at Cienfuegos, Cuba, in *Annales du Bureau Central Météorologique de France. Meteorologische Zeitschrift, Quarterly Journal of the Royal Meteorological Society* (London), *Monthly Weather Review*, and in numerous current bulletins from stations such as Prospect, Bermuda, and Richmond Hill, Grenada.

All sources of information available at the Weather Bureau have been examined and additional data have been sought through correspondence, with a view to presenting as fully as possible the meteorological conditions prevailing in this region.

In the section beginning on page 139, "Climatic conditions in the several islands or groups of islands," meteorological data more or less complete are given for the following areas:

[a] Northern Leeward Islands.
[b] Dutch West Indies, Southern Group.
[c] Virgin Islands.

The mean values for some stations are based on observations extending over rather short periods. However, since the climate is tropical or tropical-marine in almost all of the region it may be assumed that the temperature values are close approximations to true normals. The precipitation means based on records of 20 years or more may be considered as close approximations to normal values; for those based on 10 to 20 years the approximations are more or less close, depending on the period of record, while those obtained from less than 10 years are very probably to be viewed only as indicating the annual march of precipitation and, when compared with the values from the longer records, as representing in a general way the distribution of rainfall over a given area. The means for other elements, such as relative humidity, cloudiness, etc., can be assumed to be representative even when based on relatively meagre data. The extent of the series of observations is, of course, very important in regard to indications given by records of extremes; the values for stations with long records are good indices as to extreme range over a considerable area.

Throughout this paper temperatures are expressed in degrees Fahrenheit (°F.).

GENERAL CONDITIONS

Before taking up the detailed discussion of meteorological conditions on the separate islands it will be well to give a brief general description of their topographical features and a general survey of the climate of the region.

The West Indies lie between latitudes 10° and 25° north and between longitudes 60° and 85° west. They are grouped in the following divisions: Bahama Islands; the Greater Antilles, including Cuba, Haiti, Porto Rico, and Jamaica; the Lesser Antilles, including the Leeward Islands and Windward Islands; and islands off the middle coast of Venezuela.

Arranged in order of magnitude the areas in square miles are: Cuba, 45,000; Haiti, 28,000; Jamaica, 4,200, Porto Rico, 3,600; Trinidad, 1,700; Guadeloupe, 700; Martinique, 400; Dominica, 300; St. Lucia, 200; Curaçao; 200.

Nearly all of these islands are mountainous and some are very rugged. The elevations of land are of extreme importance in the control of distribution of rainfall in this trade-wind region. The following elevations in feet taken in connection with the limited extent of the land, the cross section in the direction of prevailing wind being only 25 to 50 miles for the largest islands, will indicate the abruptness of the slopes: Cuba, Organ Mountains (west), 2,500; Sierra Maestra (east), 8,300; Haiti, Loma Tina (near Santo Domingo), 10,300; Porto Rico, El Yunque, 3,750; Jamaica, Blue Mountain Peak, 7,360; St. Croix, Mount Eagle, 1,156; St. Kitts, Mount Misery,

3,770; Guadeloupe, La Soufriere, 4,900; Martinique, Mont Pele, 4,430; Dominica, Morne Diablotin, 5,315; St. Lucia, Les Pitons, 2,700; St. Vincent, Soufriere Volcano, 3,500; Barbados, Mount Hillaby, 1,100; Grenada, Mount Catharine, 2,700; Trinidad, Tucuche Peak, 3,100 feet.

INFLUENCE OF TOPOGRAPHY ON CLIMATE IN THE WEST INDIES

The mountainous character of this region affords excellent opportunity to study changes of temperature with elevation in the tropics. Table 1 gives mean annual temperatures at different elevations in Porto Rico and Jamaica.

The influence of the mountains on the distribution of precipitation also is set forth very strikingly in the contrasting amounts of mean annual precipitation for windward and leeward exposures on most of the islands. Table 2 shows the distribution in a northeast-southwest cross section of 50 miles from San Juan to Ponce in Porto Rico and in one of 25 miles from Port Antonio to Kingston in Jamaica.

TABLE 1.—*Change in mean annual temperature with elevation in Porto Rico and Jamaica*

Station	Elevation, in feet	Mean annual temperature, ° F.	Station	Elevation, in feet	Mean annual temperature, ° F.
Porto Rico			*Jamaica*		
San Juan	100	77.9	Kingston	24	79.6
Comerio Falls	500	76.3	Hope Gardens	668	77.3
Cayey	1,350	72.9	Stony Hill	1,400	74.4
Toro Negro Dam	2,275	68.8	Hill Gardens	4,900	62.2

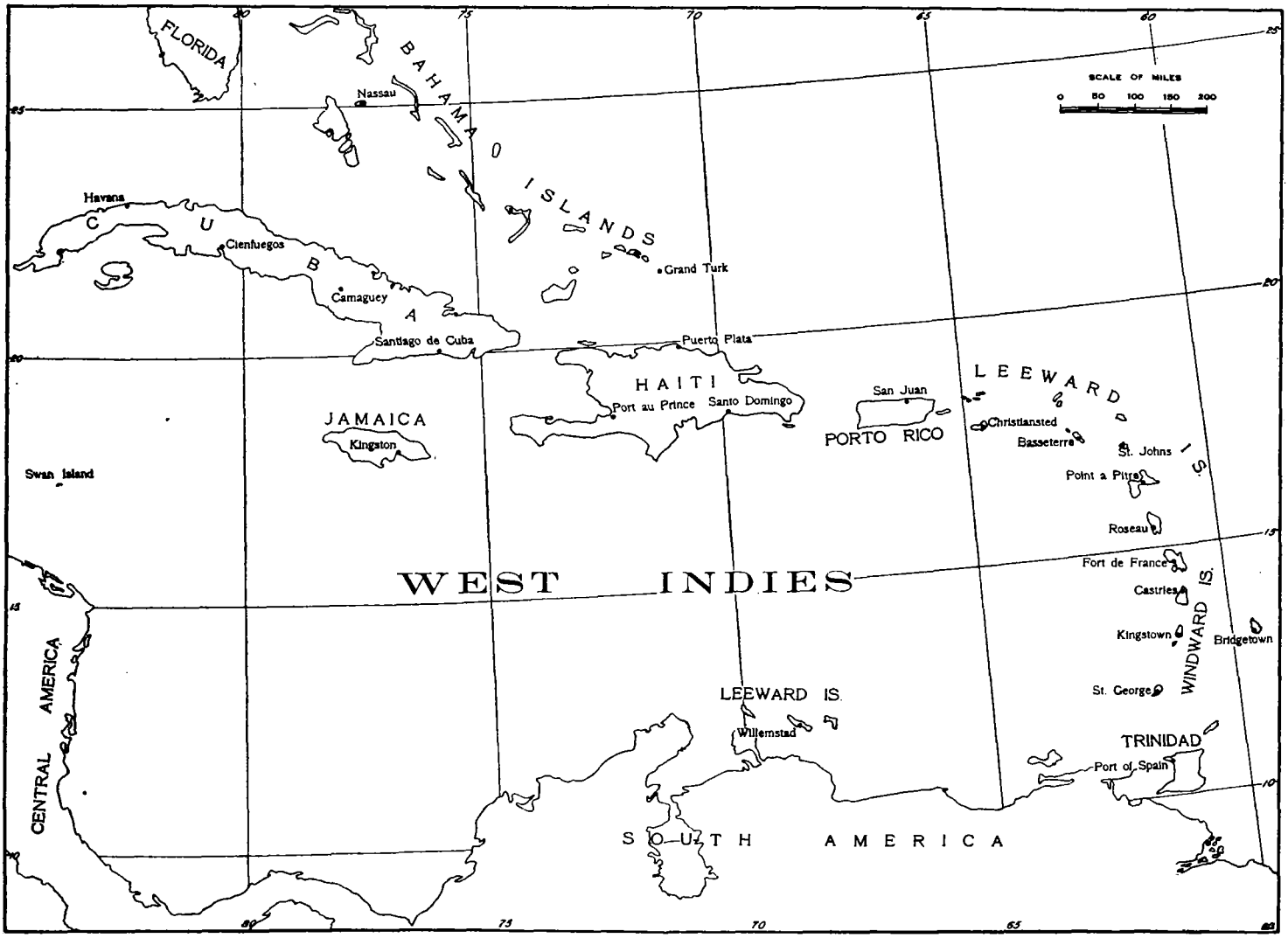


TABLE 2.—*Precipitation in cross section, Porto Rico and Jamaica*

Station	Elevation, in feet	Mean annual precipitation, in inches	Station	Elevation, in feet	Mean annual precipitation, in inches
Porto Rico			*Jamaica*		
San Juan	100	61	Port Antonio		137
Toro Negro Dam	2,275	93	Mooretown		222
Ponce	80	35	Kingston	24	34

CHIEF FEATURES OF CLIMATE IN THE WEST INDIAN REGIO

Temperature.—The mean annual temperature at or near sea level lies between 77.5° and 79.5° over almost the entire region; though at Nassau and Habana we find 76.9° and 75°, respectively, and at a few stations the values are in excess of 80°; Swan Island, 80.5°; Port au Prince, Haiti, 80.7°; and Willemstad, Curacao, 81.0°. At Toro Negro Dam, Porto Rico (2,275 feet), the annual mean is slightly below 70° (68.8°), and at Hill Gardens, Jamaica (4,900 feet), it is only slightly above 60° (62.2°).

The highest monthly mean temperature at stations in the northern part of this region occurs in July or August; the highest for stations from Martinique southward generally in September. For low elevations the maximum monthly means are generally 81° or 82°, with extremes of 78° (Camajuani, Cuba) and 84° (Port au Prince, Haiti); for the 1,500-foot level they fall to about 75°, and for the 4,900-foot level there is a further fall to 65°.

The minimum monthly means are found almost without exception in January or February; near sea level the values are as a rule 75° to 77°, with extremes of 68° (Camajuani) and 79° (Willemstad); while for the two higher levels mentioned above they are about 70° and 60°, respectively.

The mean annual range of temperature is 8° to 11° in the Bahamas and Cuba, about 5° to 7° in other islands of the Greater Antillean group, and still less in the Lesser Antilles, with minimum values about 3° at Bridgetown, Barbados, and Port of Spain, Trinidad.

While maximum temperatures of 100° or over have been recorded at some of the stations (extreme, 104° at Pinar del Rio, Cuba), the highest observed readings do not exceed 95° at many of the low stations and fall below 90° for the higher elevations (Hill Gardens, 88°). In the Greater Antilles the minimum temperatures recorded near sea level range for the greater part between 60° and 50°; in the remainder of the area at the same levels generally between 65° and 60°. The lowest temperatures observed in the West Indies did not occur at the elevated stations of Toro Negro Damor Hill Gardens (minima 46° and 44°, respectively), but at Moron (38°) and Camajuani (40°), both at low elevations, a few miles inland from the middle portion of the northern coast of Cuba.

Table 3 contains data on mean annual temperature, highest and lowest monthly means, mean annual range of temperature, and extreme temperatures for a number of selected stations for which the complete tabulated data follow in the discussion of the several islands. The stations are divided into two groups—those near sea level and those having elevations of 500 feet or more. The mean temperatures are derived by the formula (max. + min.) ÷ 2, chosen because means of daily extremes are available for practically all of the stations, while means according to other formulas, such as (7 a. + 2 p. + 9 p.) ÷ 3 can be had for only a few.

TABLE 3.—*Mean and extreme temperatures (° F.) West Indian Islands* [a]

Stations	Length of record, years	Elevation, feet	Mean annual temperature	Mean temperature warmest month	Month	Mean temperature coolest month	Month	Mean annual range of temperature	Highest temperature	Lowest temperature
AT ELEVATIONS OF LESS THAN 500 FEET										
Prospect 1[e] (*Bermuda Is.*)	24	151	69.8	79.4	Aug.	61.8	Feb.	17.6	94	39
Nassau 2 (*Bahama Is.*)	15	12	76.9	82.4	Aug.	71.3	Jan.	11.1	94	51
Grand Turk 3 (*Turks I.*)	9	12	79.1	83.0	Aug.	75.0	Jan.	8.0	92	60
Cuba										
Pinar del Rio 4	20	180	77.6	82.8	July	71.4	Jan.	11.4	104	46
Habana 4	21	161	75.0	79.5	Aug.	69.8	Jan.	9.7	95	50
Nueva Gerona 4	9	200	77.8	81.9	July	71.8	Feb.	10.1	102	50
Cienfuegos 5, "Montserrat"[b]	11	98	76.2	80.6	Aug.	71.2	Feb.	9.4	95	45
Camajuani 4	16	325	73.5	78.4	Aug.	67.6	Jan.	10.8	99	40
Camaguey 4	13	344	77.4	81.6	*July	71.6	Jan.	10.0	102	45
Preston 4	10	16	77.7	81.2	Aug.	73.6	Jan.	7.6	102	50
Santiago de Cuba 4	16	118	78.9	82.2	Aug.	75.1	Feb.	7.1	97	55
Jamaica										
Kingston 6	16	24	79.6	82.0	Aug.	76.8	Feb.	5.2	98	57
Morant Point 6	16	8	79.6	82.2	Aug.	77.2	*Feb.	5.0	92	57
Negril Point 6	16	33	78.5	80.4	*July	75.8	Feb.	4.6	94	57
Haiti										
Cape Haitien 7	7	49	77.1	80.6	*Aug.	73.0	Feb.	7.6	92	57
Cayes 7	13	23	78.2	80.4	Aug.	75.6	Feb.	4.8	99	59
Gonaives 7	4	10	80.7	83.1	July	77.9	Feb.	5.2	100	58
Port au Prince 7	20	121	80.7	84.0	July	78.0	Jan.	6.0	100	59
Dominican Republic										
Puerto Plata 7	1 3	40	77.9	81.4	Aug.	74.2	Feb.	7.2	94	59
Santo Domingo 8	5	60	78.2	80.6	Aug.	75.2	*Jan.	5.4	95	57
Porto Rico										
San Juan 9	25	100	77.9	80.4	*Aug.	74.9	Jan.	5.5	94	62
Arecibo 9	21	75	77.9	80.6	*Aug.	74.3	Jan.	6.3	101	52
Humacao 9	18	100	77.2	80.2	Aug.	73.7	Jan.	6.5	98	52
Mayaguez 9	24	80	77.0	79.3	Sept.	74.2	*Jan.	5.1	99	51
Ponce 9	19	80	78.6	81.5	Aug.	75.2	*Jan.	6.3	96	55
Virgin Islands										
Charlotte Amalie 10	7	27	79.9	82.9	Aug.	77.0	Jan.	5.9	92	67
Christiansted 11	17	82	79.3	81.8	*Aug.	76.3	Feb.	5.5	96	64
Basseterre 12 (*St. Kitts*)	13	29	78.9	81.4	Aug.	76.2	*Feb.	5.2	92	64
St. Johns 13 (*Antigua*)	11	80	79.5	82.0	Aug.	76.8	Feb.	5.2	93	60
Point a Pitre 14 (*Guadeloupe*)	6	15	78.6	81.7	July	74.6	Feb.	7.1	90	61
Roseau 15 (*Dominica*)	6	25	80.0	82.2	Sept.	77.2	Feb.	5.0	97	63
Fort de France 16 (*Martinique*)	15	13	78.8	80.6	Sept.	76.2	*Jan.	4.4	93	59
Castries 17 (*St. Lucia*)	4	319	78.5	80.4	Sept.	75.9	Jan.	4.5	93	66
Kingstown 18 (*St. Vincent*)	3	80	79.0	81.0	Sept.	77.0	*Jan.	4.0	91	64
Bridgetown 19 (*Barbados*)	5	30	79.6	81.0	Aug.	77.6	Feb.	3.4	90	65
Trinidad										
Port of Spain, 20 U. S. W. B.	8	40	79.6	80.8	Sept.	78.1	Jan.	2.7	95	66
Port of Spain, 21 St. Clair	20	67	77.6	79.0	May	75.8	Jan.	3.2	101	56
Willemstad 22 (*Curacao*)	15	75	81.0	83.0	Sept.	78.8	Jan.	4.2	94	67
Swan Island 23	7	35	80.5	82.2	*May	77.8	Jan.	4.4	92	64

(See footnotes at end of table.)

TABLE 3.—*Mean and extreme temperatures (° F.) West Indian Islands* [a]

Stations	Length of record, years	Elevation, feet	Mean annual temperature	Mean temperature warmest month	Month	Mean temperature coolest month	Month	Mean annual range of temperature	Highest temperature	Lowest temperature
AT ELEVATIONS OF 500 FEET OR MORE										
Comerio Falls 9 (*Porto Rico*)	18	500	76.3	79.1	Sept.	72.6	Jan.	6.5	99	50
St. George 24 (*Grenada*)	12	509	78.9	80.4	Sept.	77.1	Jan.	3.3	93	68
Hope Gardens 6 (*Jamaica*)	16	668	77.3	80.2	July	74.4	Feb.	5.8	97	55
Petion Ville 7 (*Haiti*)	11	1,312	76.4	79.4	July	73.4	Jan.	6.0	97	54
Cayey 9 (*Porto Rico*)	19	1,350	72.9	76.1	Aug.	69.0	Jan.	7.1	94	44
Stony Hill 6 (*Jamaica*)	16	1,400	74.4	77.0	July	71.9	Feb.	5.1	93	54
Morne des Cadets 25 (*Martinique*)	9	1,676	74.0	76.5	Sept.	71.0	Feb.	5.5	90	59
Camp Jacob 26 (*Guadeloupe*)	10	1,750	72.2	74.8	Aug.	68.8	Feb.	6.0	87	56
Toro Negro Dam 9 (*Porto Rico*)	9	2,275	68.8	72.7	Aug.	65.9	Feb.	6.8	87	46
Hill Gardens 6 (*Jamaica*)	16	4,900	62.2	65.2	July	59.2	Feb.	6.0	80	44

[a] The Bermuda Islands do not form part of this group, but since they are not far distant rom the northern Bahamas the data for Prospect are included, but not considered in the foregoing text.
[b] Means from readings at 6 a. m. and 2 p. m.
[c] Also in another month; see complete table for station.

In the following notes the period of record embraces the period from the first to the last year of the series of observations whether continuous or broken.
1. Meteorological observations taken at Prospect, Bermuda, appearing for a time as supplement to the Bermuda Colonist and Daily News. Period 1899–1923.
2. Quarterly Journal of the Royal Meteorological Society (London), January, 1921. Period 1905–1919.
3. U. S. Weather Bureau records. Period 1916–1924; series 1900–1908 not included.
4. Boletin Oficial de la Secretaria de la Agricultura, Comercio y Trabajo, Servicio meteorologico, Habana. Period 1899–1920.
5. Anales del Observatorio del Colegio Ntra. Sra. de Montserrat, Cienfuegos. Period 1911–1921.
6. Jamaica Weather Report, Kingston. Period 1908–1923.
7. Bulletin Semestriel de l'Observatoire Météorologique du Séminaire-College St. Martial, Port au Prince. Period 1906–1921.
8. Annales du Bureau Central Météorologique de France, Paris. Period 1910–1914.
9. Climatology of Porto Rico (advance copy). U. S. Weather Bureau, San Juan. Period 1899–1923.
10. U. S. Weather Bureau records. Period 1917–1924.
11. Meteorologisk Aarbog, Danske Meteorologiske Institut. Period 1900–1917; series 1876–1899 not included.
12. U. S. Weather Bureau records. Period 1899–1924 (broken series); series 1892–1898 not included.
13. Meteorological Summary, Government Laboratory, St. Johns, Antigua. Period 1910–1920; series 1890–1900 not included.
14. Annales du Bureau Central Météorologique de France, Météorologie générale, 1885. Period 1879–1884.
15. U. S. Weather Bureau records. Period 1917–1924.
16. Annales du Bureau Central Météorologique de France. Period 1900–1914.
17. U. S. Weather Bureau records. Period 1918–1921.
18. Meteorological Return, Experiment Station, St. Vincent. Period 1920–1922.
19. U. S. Weather Bureau records. Period 1899–1903.
20. U. S. Weather Bureau records. Period 1916–1924.
21. Meteorological Return, Trinidad. Period 1901–1921.
22. Encyclopaedia van Nederlandsch West Indie. Period 1898–1912.
23. U. S. Weather Bureau records. Period 1917–1924.
24. Meteorological Report, Grenada. Period 1910–1921.
25. Annales du Bureau Central Météorologique de France. Period 1906–1914.
26. Annales du Bureau Central Météorologique de France, Mémoires, 1901. Period 1891–1900.

Relative humidity.—In his paper on the Climate of Cuba (in Proceedings of the Second Pan American Scientific Congress, Vol. II, p. 132) Mariano Gutierrez-Lanza gives the daily march of relative humidity at Habana. The following table contains these data with the addition of interpolations in parentheses.

TABLE 4.—*Daily march of relative humidity at Habana (Belen College)*

Hour	Per cent	Hour	Per cent	Hour	Per cent
1 a. m.	(83)	9 a. m.	(72)	5 p. m.	(69)
2 a. m.	(84)	10 a. m.	66	6 p. m.	72
3 a. m.	(85)	11 a. m.	(64)	7 p. m.	(75)
4 a. m.	86	12 noon	63	8 p. m.	77
5 a. m.	(86)	1 p. m.	(63)	9 p. m.	(79)
6 a. m.	86	2 p. m.	64	10 p. m.	80
7 a. m.	(82)	3 p. m.	(65)	11 p. m.	(81)
8 a. m.	78	4 p. m.	66	12 p. m.	(82)

Mean, 75.

Assuming that the interpolations are admissible as approximately correct and that the march of humidity does not vary to any large degree in the West Indies, it appears that the means derived by the formulas (8 a.+8 p)÷2, (7 a.+1 p.+9 p.)÷3, and (7 a.+3 p.)÷2 (those mostly used), give fairly accurate values for the mean of 24 hours.

According to the records available, there is considerable difference in mean annual relative humidity at sea level between stations with windward and leeward exposure, as follows: 79 per cent at San Juan and 76 per cent at Habana in contrast to 73 per cent at Kingston and 69 per cent at Port au Prince. The lowest relative humidity occurs generally in March or April, when precipitation is still light and temperatures have risen considerably from the minima of the preceding months; the highest relative humidity is usually found in October or November, at the time of maximum precipitation. The range in monthly means of relative humidity is between 63 per cent and 76 per cent at Port au Prince, 71 per cent and 78 per cent at Kingston, 72 per cent and 80 per cent at Habana, and 76 per cent and 80 per cent at San Juan.

Cloudiness.—The means for cloudiness at the different stations are determined from a varying number of observations at different hours. From these data the mean annual cloudiness is found to be between 4.5 and 6.0, without marked change from the maximum in May or June to the minimum in the period from December to March.

Precipitation.—In the West Indies there are remarkable differences in the amounts of rainfall received on windward and leeward exposures and in low and elevated regions; the contrasts are, of course, especially great between high windward and low leeward stations. Table 5 contains the most interesting examples of extreme conditions relative to mean annual rainfall.

Most of these sharp contrasts are between stations separated by only a few miles; the greatest difference, that of 190 inches between Mooretown and Kingston in Jamaica, occurs within a distance of only 30 miles. The most striking example of great difference in precipitation within a few miles is found in Dominica. Roseau, on the western coast, at an elevation of 25 feet, has a mean annual precipitation of 78 inches, while Shawford, about 3 miles to the northeast, at an elevation of 560 feet, has a mean annual amount of 185 inches.

TABLE 5.—*Extremes of mean annual precipitation in different islands (or divisions)*

Island (division)	Greatest annual mean (in inches)	Station	Least annual mean (in inches)	Station
Jamaica	222	Mooretown	32	Kingston.
Haiti	103	Mirebalais	20	Mole St. Nicolas.
Dominican Republic	78	Sanchez	21	Azua.
Porto Rico	93	Toro Negro Dam	36	Ponce.
Guadeloupe	156	Camp Jacob	57	Celcour.
Dominica	185	Shawford	70	Batalie.
St. Lucia	130	Uplyme	49	Moule a Chique.
Grenada	147	Grand Etang	39	Point Saline.
Trinidad	112	Sangre Grande	56	Port of Spain.

For the entire West Indian region the extremes of mean annual precipitation are 222 inches at Mooretown, Jamaica, and 17 inches at Oranjestad, on the small island of Aruba, off the Venezuelan coast. The accompanying table gives monthly and annual means for these stations.

TABLE 6.—*Mean precipitation (in inches). Mooretown, Jamaica, and Oranjestad, Aruba*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Mooretown	24	17.48	12.92	9.78	11.76	18.97	21.77	17.72	15.54	15.39	19.92	34.65	26.08	221.98
Oranjestad	24	2.01	0.58	0.66	0.64	0.38	0.53	0.97	1.03	1.28	2.92	3.43	2.98	17.41
Difference		15.47	12.34	9.12	11.12	18.59	21.24	16.75	14.51	14.11	17.00	31.22	23.10	204.57

There is very little uniformity as to the month of maximum or minimum rainfall, not only for different parts of the territory as a whole but also for different regions of individual islands. The greatest monthly amounts are generally received during the period from July to November and the least amounts from January to April. In nearly all of the islands the greatest monthly amounts are above 10 inches and at some stations they reach 20 and even 30 or more inches, while, on the other hand, the lowest monthly means fall below 1 inch.

Table 7 gives for selected stations the mean annual precipitation (in inches), the highest and lowest monthly means, and the range in mean monthly precipitation. The stations have been selected to show the differences in mean annual precipitation where these are considerable on the several islands.

TABLE 7.—*Mean annual precipitation, highest and lowest monthly means and range in monthly means (in inches)*

Stations	Length of record, years	Mean annual precipitation	Highest monthly mean	Month	Lowest monthly mean	Month	Range of mean monthly precipitation
Prospect 27 (*Bermuda Is.*)	55	57.80	5.95	Oct.	4.10	Apr.	1.85
Nassau 2 (*Bahama Is.*)	56	50.99	7.54	Sept.	1.49	Dec.	6.05
Grand Turk 28 (*Turks I.*)	40	28.65	4.51	Nov.	1.11	Mar.	3.40
Cuba							
Cienfuegos, 5 "Montserrat"	11	38.75	5.82	June	0.69	Jan.	5.13
Habana 29	25	43.00	6.21	Oct.	1.33	Feb.	4.88
Santiago de Cuba 29	21	43.79	7.40	Oct.	0.87	Feb.	6.53
Camaguey 29	20	56.07	10.52	June	1.40	Feb.	9.12
Pinar del Río 29	25	61.78	10.65	Sept.	1.39	Dec.	9.26
Nueva Gerona 29	13	70.68	11.96	June	1.47	Jan.	10.49
Jamaica							
Kingston 30 *	53	32.52	6.96	Oct.	0.67	Feb.	6.29
St. Anns Bay 30	28	60.75	10.13	Nov.	2.85	Mar.	7.28
Balaclava 30	27	81.53	12.78	May	1.94	Jan.	10.84
Hill Gardens 30	49	105.48	17.20	Oct.	3.64	July	13.56
Shrewsbury 30	23	166.50	30.70	Nov.	8.52	Mar.	22.18
Mooretown 30	24	221.98	34.65	Nov.	9.78	Mar.	24.87
Haiti							
Mole St. Nicolas 7	17	19.79	2.78	▪Sept.	0.94	▪Apr.	1.84
Gonaives 7	20	20.21	3.85	June	0.25	Jan.	3.60
Ganthier 7	24	32.15	5.59	May	0.59	Jan.	5.00
Port au Prince 7 *	44	55.03	9.42	May	1.15	Jan.	8.27
Cayes 7	16	83.94	13.71	Oct.	3.34	Jan.	10.37
Mirebalais 7	10	103.11	15.66	Sept.	0.68	Jan.	14.98
Dominican Republic							
Azua 31	6	21.03	3.86	May	0.09	Dec.	3.77
San Pedro de Macoris 31	14	44.37	7.55	Sept.	1.57	Mar.	5.98
Santo Domingo 32	14	55.46	7.29	Oct.	1.20	Feb.	6.09
Puerto Plata 7 *	17	66.33	14.40	Nov.	1.66	June	12.74
Sanchez 31	10	78.38	8.90	Aug.	3.80	Feb.	5.10
Porto Rico							
Ponce 9	23	35.83	6.72	Oct.	0.97	Feb.	5.75
San Juan 9	25	60.64	6.86	Nov.	2.71	Feb.	4.15
Mayaguez 9	25	81.00	11.47	Aug.	1.87	Jan.	9.60
Toro Negro Dam 9	13	92.65	15.22	Oct.	3.97	Jan.	11.25
Virgin Is.							
Charlotte Amalie 33	17	40.89	6.15	Oct.	1.87	Feb.	4.28
Christiansted 34	37	46.43	5.89	Nov.	1.24	Mar.	4.65
St. Kitts							
Lower Canada 35	18	45.01	5.96	Sept.	1.57	Feb.	4.39
Basseterre 36	56	49.73	6.38	Sept.	1.95	Feb.	4.43
Brotherson 35	5	85.21	13.52	Nov.	2.58	Mar.	10.94
St. Johns 37 (*Antigua*)	50	49.38	5.74	Oct.	2.24	▪Feb.	3.50
Guadeloupe							
Celcour 14	19	56.72	6.42	Oct.	2.56	Feb.	3.86
Point a Pitre 14 *	19	91.80	10.39	Aug.	3.27	Feb.	7.12
Josephine 14	6	120.87	14.88	July	6.25	Apr.	8.63
Camp Jacob 26	10	156.22	20.20	July	6.73	Feb.	13.47
Dominica							
Batalie 38	5	69.92	9.43	July	1.09	Apr.	8.34
Roseau 39 *	27	77.64	10.75	July	2.97	Apr.	7.78
St. Arooment 38	20	105.03	14.40	July	3.80	Apr.	10.60
Shawford 38	5	193.28	23.08	July	9.09	Feb.	13.99
Martinique							
Robert 40	3	51.30	8.98	Dec.	1.46	Jan.	7.52
Fort de France 41 *	31	80.21	10.31	Aug.	2.91	Mar.	7.40
Morne des Cadets 25	9	120.19	15.24	Aug.	6.29	May	8.95
St. Lucia							
Moule a Chique 42	10	48.78	6.58	Oct.	1.55	Feb.	5.03
Choiseul 42	7	64.04	9.05	Oct.	2.01	Feb.	7.04
Castries 43	34	91.00	10.45	Aug.	3.89	Feb.	6.56
Uplyme 42	10	129.95	15.00	July	6.30	Apr.	8.70
St. Vincent							
Bayabou 44	6	69.56	10.08	Sept.	1.70	Apr.	8.38
Kingstown 45	11	90.80	12.60	Nov.	3.59	Mar.	9.01
Barbados							
Bridgetown 46	17	54.95	7.98	Sept.	1.54	Feb.	6.44
Binfield 46	18	66.43	9.47	Oct.	1.76	Mar.	7.71
Dunscombe 46	17	85.92	11.52	Sept.	2.96	Feb.	8.56
Grenada							
Point Saline 24	10	38.99	6.35	Aug.	0.39	Apr.	5.96
St. George 47	30	76.56	9.80	July	2.24	Apr.	7.56
Grand Etang 24	10	146.90	16.89	Nov.	6.49	Feb.	10.40
Tobago							
Government Farm 48	13	46.04	6.22	Oct.	0.90	Mar.	5.32
Botanic Station 48	23	71.62	9.20	July	1.95	Mar.	7.25
Roxborough Estate 48	12	91.10	11.19	Oct.	3.01	Apr.	8.18
Trinidad							
Port of Spain 49	26	56.41	8.42	Aug.	1.12	Feb.	7.30
Siparia 49	28	83.24	11.80	July	2.63	Feb.	9.17
Blanchisseuse 49	29	85.66	11.41	July	3.26	Apr.	8.15
Sangre Grande 49	27	111.92	13.99	July	4.08	Feb.	9.91
Willemstad 50 (*Curacao*).*	70	22.93	4.43	Nov.	0.76	May	3.67
Oranjestad 51 (*Aruba*) *	24	17.41	3.43	Nov.	0.38	May	3.05
Swan Island 52	10	51.13	8.73	Nov.	0.98	Apr.	7.75

(See footnotes at end of table.)

TABLE 7.—*Mean annual precipitation, highest and lowest monthly means and range in monthly means (in inches)*—Continued

* From normal monthly and annual precipitation in the Caribbean region published in Climatological Data, West Indies and Caribbean Service, July, 1925.

▪ Also in another month.

In the following notes the period of record embraces the period from the first to the last year of the series of observations whether continuous or broken.

1-26. See footnotes to Table 3.

27. Contributed in Monthly Weather Review, January, 1925 by W. H. Potter. Period 1879–1924.

28. U. S. Weather Bureau records. Period 1880–1924.

29. Bulletin No. I, Tropical Research Foundation, Rainfall and Temperature of Cuba, by O. L. Fassig.

30. The Rainfall of Jamaica, 1870–1919, by Maxwell Hall.

31. Revista de Agricultura, 1917, Santo Domingo, and Climatological Data, West Indies and Caribbean Service, U. S. Weather Bureau, San Juan, Porto Rico. Period 1909–1924.

32. U. S. Weather Bureau records and Annales du Bureau Central Météorologique de France 1910–1914. Period 1898–1924.

33. Annalen der Hydrographie und Maritimen Meteorologie, 1877, and U. S. Weather Bureau records 1917–1924. Periods 1863–1872 and 1917–1924.

34. Meteorologiske Aarbog, Danske Meteorologiske Institut. Period 1875–1916.

35. Monthly Weather Review, November, 1900.

36. Monthly Weather Review, Annual, 1899, and U. S. Weather Bureau records. Period 1856–1924.

37. Monthly Weather Review, April, 1901, and Meteorological Summary, Government Laboratory, St. Johns, Antigua. Period 1866–1923.

38. Quarterly Journal of the Royal Meteorological Society (London), October, 1897, and January, 1903.

39. Meteorologische Zeitschrift, October, 1886. Period 1865–1885. U. S. Weather Bureau records, 1917–1924 not included.

40. Climatological Data, West Indies and Caribbean Service, U. S. Weather Bureau, San Juan, Porto Rico. Period 1921–1923.

41. Annales du Bureau Central Météorologique de France, 1891–1914.

42. Rainfall Returns, St. Lucia. Period 1906–1921.

43. Rainfall Returns, Santa Lucia, 1908 (summary)–1923. Period 1890–1923.

44. Die Verteilung des Niederschlags auf der festen Erdoberfläche. Supan.

45. Meteorological Returns, St. Vincent. Period 1913–1923.

46. Meteorological Tables, Botanic Station, Barbados. (For periods see note under Table 57.)

47. Meteorological Report, Grenada, 1921. Period 1892–1921.

48. Meteorological Returns, Trinidad. Period 1900–1923.

49. Meteorological Returns, Trinidad. 1891–1919. (See footnotes to Table 64.)

50. Encyclopaedia van nederlandsch West Indie and Meteorologische Waarnemingen, Suriname en Curaçao. Periods 1894–1902 and 1905–1923.

51. Meteorologische Waarnemingen, Suriname en Curaçao. Period 1905–1923.

52. U. S. Weather Bureau records. Period 1915–1924.

Data on maximum rainfall in 24 consecutive hours are not available for many of the regions. The maxima (in inches) for some of the more important stations are as follows: Nassau, 8; Habana, 8.30; Kingston, 8.93; Port au Prince, 5.78; San Juan, 10.55; Basseterre, St. Kitts, 10.60; Castries, St. Lucia, 13.14; Kingstown, St. Vincent, 6.88; St. George (Richmond Hill), Grenada, 4.35. Interesting data on a remarkable series of torrential rains will be found in the discussion of precipitation in Jamaica.

The figures indicating frequency of precipitation do not admit of strict comparison since they are obtained in different ways. The minimum amount of precipitation characterizing a day as rainy is either 0.01 inch or 0.1 mm. (0.004 inch) for most of the stations. For the Greater Antilles the available data show the following range in number of rainy days in the year: Cuba, 92 to 115; Haiti, 43 to 135; Porto Rico, 92 to 213; and Jamaica, 76 to 178. For stations in the Lesser Antilles we find a rather considerable range: Christiansted, 136; Bridgetown, 171; Roseau, 209; St. Johns, 242; Castries, 260; and the elevated stations of Camp Jacob and Morne des Cadets, 288 and 290, respectively.

In the July, 1925, issue of Climatological Data, West Indian and Caribbean Service (San Juan, Porto Rico), appears a table containing monthly and annual means of precipitation for island areas. The regions with least annual precipitation, 27 to 32 inches, are the Bahamas, Turks and Caicos Islands, and Curaçao; Jamaica, Martinique, and Tobago receive annually about 75 inches, and for St. Lucia and Dominica there is a further increase to 80 and 93 inches, respectively. Table 8 gives data for the more important islands.

TABLE 8.—*Mean precipitation (in inches), for island areas*

Islands	Number of stations	Length of record, years	January	February	March	April	May	June	July	August	September	October.	November	December	Annual
Bahama	15	4–5	1.62	0.90	1.31	2.35	4.87	3.02	2.77	2.50	3.73	6.83	2.27	0.74	32.28
Turks-Caicos	7	4–5	1.99	1.39	1.05	1.33	1.63	1.22	1.76	1.32	3.12	4.14	4.86	1.38	24.62
Cuba	20	20	1.92	1.53	2.11	2.85	6.79	8.37	5.22	5.78	7.81	6.79	3.67	2.15	54.99
Jamaica	210	20–60	3.84	3.06	3.23	5.06	9.14	7.30	5.26	6.84	7.54	10.57	8.22	5.56	75.62
Haiti, west [a]	25	8–44	1.77	2.17	2.55	4.46	6.81	4.47	3.36	4.66	5.92	6.07	4.57	2.21	49.00
Haiti, east [b]	40	4–5	2.93	1.92	2.41	3.17	3.70	3.58	4.71	4.31	5.85	5.05	4.90	3.32	45.29
Porto Rico	40	10–26	3.68	2.98	3.43	4.74	6.57	6.43	6.49	7.26	7.95	8.18	7.38	4.85	65.94
St. Thomas	3–5	48	2.76	2.12	1.87	2.56	4.32	3.73	3.86	4.50	4.86	5.98	6.42	3.85	46.83
St. Croix	3	73	2.33	1.92	1.68	2.68	4.32	3.90	3.59	4.47	5.70	6.61	5.25	3.47	45.92
St. Kitts	4	25	3.64	2.56	2.36	3.14	4.62	4.36	4.80	6.42	6.66	6.35	5.82	4.39	55.12
Antigua	70	25	2.57	1.70	1.66	2.62	3.07	2.91	3.48	3.86	5.06	5.27	5.84	3.54	41.58
Montserrat	6	30	4.21	2.71	3.09	3.03	4.63	4.60	5.36	5.56	6.63	6.46	7.35	5.15	58.78
Guadeloupe	45	8	4.09	3.53	2.52	4.19	4.66	4.30	5.58	5.44	7.33	10.23	8.97	4.61	65.45
Dominica	10	8	6.59	4.33	4.61	4.15	5.44	7.77	12.22	12.02	10.15	10.90	7.60	7.47	93.25
Martinique	20	4–5	4.46	3.18	2.71	2.89	3.15	8.32	9.26	9.66	10.36	8.00	7.42	9.63	77.20
St. Lucia	10–30	10	5.40	3.85	3.56	2.68	4.32	7.40	9.14	10.11	8.94	10.31	7.77	6.76	80.24
Barbados	3–233	78	3.46	2.26	2.06	2.42	3.38	5.57	6.14	7.45	7.74	7.75	7.28	4.98	60.49
Tobago	5	16	4.28	2.68	2.15	2.35	4.41	8.71	9.40	8.07	8.26	8.80	8.89	6.64	74.64
Trinidad	12–90	53	3.71	1.90	2.23	2.32	4.52	9.21	9.42	9.52	7.01	6.45	7.61	6.16	70.06
Curaçao	10	4–5	2.25	1.13	1.82	0.40	0.25	0.73	1.72	1.32	1.53	6.94	4.25	5.64	27.10

[a] Republic of Haiti. [b] Dominican Republic.

Thunderstorms.—Data on the number of days with thunderstorm do not cover any considerable period except at a few stations, but these are rather well distributed over the West Indian area. The mean annual number of days with thunderstorm varies rather widely: Port au Prince, 114; Cienfuegos, 101; Habana, 78; Kingston, 54; San Juan, 49; Christiansted, 16; St. Johns, 15; St. George, Grenada, 12. In these figures we note a striking difference between conditions over the Greater Antilles and those over the smaller Leeward and Windward Islands. From November to April thunderstorms are rare, and in the smaller islands they are practically unknown from January to April. In May and June there is a considerable increase in frequency and later a further slight increase to the maximum during the three-month period beginning with July; at that time the average monthly number of days with thunderstorm is from 15 to 20 for Port au Prince, Cienfuegos, and Habana, but less than 5 for stations on the smaller islands.

Fog.—From data published in the West Indies Pilot it appears that fog of any considerable density is practically unknown at low elevations in the southern part of this region; farther north in the Lesser Antilles, the mean annual number of days with fog is about 2, and at Habana and Cienfuegos there is an increase to 8 and 11, respectively. During the period of maximum frequency, January to March, the mean monthly number of foggy days at these two stations is about 2.

Wind.—The prevailing winds are from east or northeast, with many stations showing the former direction in all months. At Nassau and Habana we find in the prevailing directions in the warmer months a slight veering (from northeast to southeast and from northnortheast to east, respectively), which is probably connected with the development of the sea breeze. The fact that no change is noted at many stations may be due in part to the small land area or to the choice of hours of observation. The phenomenon of alternation of land and sea breezes reaches a marked development in some regions as, for example, at Cienfuegos, Kingston, and Port au Prince.

Mean annual wind velocities are not strictly comparable on account of differences in the elevation of the anemometer, but it appears that the highest mean value is that of 13 miles per hour at San Juan (open exposure, elevation 54 feet) and that the means range down to 5 miles per hour at Santo Domingo and Roseau. In the Bahamas and Cuba wind velocities have a slightly marked maximum from November to April; at several stations in the remainder of the area the maximum occurs in the period from May to August.

Maximum wind velocities have been recorded for only a few stations; the following (in miles per hour) are the extremes reported: Habana, 134, October 11, 1909 (other high values in station table); San Juan, 92, August 22, 1916; Basseterre, St. Kitts, 72, August 7, 1899; and Bridgetown, 62, September 10, 1898.

Days with winds of gale force are rare in the West Indies, especially in the southern part of the region. At Nassau, Cienfuegos, and San Juan the mean annual number of days with gale winds is about 3; at Habana

there is a rather large increase, the mean annual number being 18 for the period from 1911 to 1921. Gales are more frequent in the cooler season; at Habana the mean monthly frequency is about 2 from November to April.

Hurricanes.—A recent paper by C. L. Mitchell, issued as Supplement No. 24, MONTHLY WEATHER REVIEW, contains charts showing tracks of hurricanes for the years 1887–1923, and tables giving monthly and annual frequency of tropical storms. The following table is reproduced.

TABLE 9.—*Monthly frequency of West Indian hurricanes and other tropical storms of the North Atlantic Ocean (1887–1923)*

[From Weather Bureau Supplement No. 24]

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Season
Number of storms	1	16	17	39	78	71	15	2	239
Percentage	0	7	7	16	33	30	6	1	------

	Storms of known hurricane intensity	Doubtful	Not of hurricane intensity	Total
May	0	0	1	1
June	6	5	5	16
July	10	3	4	17
August	32	3	4	39
September	46	15	17	78
October	26	23	22	71
November	2	6	7	15
December	0	2	0	2
Total	122	57	60	239
Percentage	51	24	25	----------

CLIMATIC CONDITIONS IN THE SEVERAL ISLANDS OR GROUPS OF ISLANDS

The remainder of this paper will be devoted to a presentation of short descriptive text and tabulated data for the different islands composing this extensive group. Throughout text and tables, temperatures are given in degrees Fahrenheit; relative humidity, in percentage of saturation; cloudiness, according to the scale 0–10; precipitation, in inches; wind velocity, in miles per hour.

BERMUDA ISLANDS

The mean annual temperature is 75°; the mean for August is 85° and that for February is 67°, the difference of 18° showing a considerable change from summer to winter. The recorded absolute extremes are 94° and 39°. The relative humidity averages 82 per cent at 9 a. m., 78 per cent at 3 p. m., and 85 per cent at 9 p. m. for mean annual values; the maxima from May to September are only slightly higher. Precipitation is very uniformly distributed through the year; the maximum in October (6 inches) and the minimum in April (4 inches) show very little departure from the mean monthly value of 5 inches (annual mean, 57.80 inches). Southerly winds prevail and are especially frequent from June to August; northerly winds are frequent except in the period just mentioned and prevail from October to December. The wind velocity presents a very regular annual march with a maximum of 16 miles per hour in February and a minimum of 10 miles per hour in August.

The *Meteorologische Zeitschrift* for August, 1897, gives a summary of the data for the period 1852–1886, published in full in Meteorological Observations at the Foreign and Colonial Stations of the Royal Engineers and the Army Medical Department, London Meteorological Office, No. 83. The MONTHLY WEATHER REVIEW for January, 1925, contains a tabulation of monthly precipitation for the period 1870–1924, prepared by W. H. Potter.

The records for Prospect (32° 18′ N., 64° 46′ W., elevation 151 feet), near Hamilton, for recent years form the basis of Table 10.

TABLE 10.—*Prospect, Bermuda*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	24	67.7	66.9	68.2	69.9	74.3	79.5	83.9	85.1	83.0	78.7	72.9	69.3	75.0
Mean minimum	24	57.6	56.7	57.7	59.2	63.8	69.1	72.8	73.8	72.1	68.9	63.1	59.7	64.5
Mean	24	62.6	61.8	63.0	64.6	69.0	74.3	78.4	79.4	77.6	73.8	68.0	64.5	69.8
Highest	32	79	75	78	80	83	88	92	94	91	88	82	79	94
Lowest	32	39	45	44	40	49	54	65	64	61	57	49	46	39
Relative humidity														
Mean, 3 observations [a]	10	82	82	80	81	83	84	82	82	83	81	80	80	82
Cloudiness														
Mean, 3 observations [a]	12	6.7	6.6	5.9	5.7	5.6	5.6	5.3	5.2	5.2	5.5	6.2	6.4	5.8
Precipitation														
Mean	55	4.48	4.60	4.74	4.10	4.54	4.49	4.53	5.40	5.19	5.95	5.01	4.78	57.80
Maximum in 24 hours	47	3.84	3.30	5.86	10.75	5.50	8.00	3.35	3.08	6.58	5.04	6.00	4.64	10.75
Days with rain	23	16	16	14	11	9	11	12	14	13	14	15	17	162
Days with thunderstorm	22	1	1	1	1	1	2	3	4	3	2	1	1	21
Wind														
Prevailing direction, 3 observations [a]	12	sw.	sw. nw.	sw.	sw.	sw.	sw.	sw.	sw.	sw.	ne.	ne. nw.	nw.	sw.
Mean hourly velocity	14	14.1	15.6	15.0	13.9	11.2	10.9	10.3	9.5	10.1	11.7	13.4	13.9	12.5
Maximum velocity [b]	9	42	51	48	42	31	34	28	30	56	38	54	46	56
Direction at maximum velocity	----------	s. w.	s.	n. w.	n. e.	s. w.	s. w.	s. w.	s. w.	n. e.	n. w.	n. e.	s.	n. e.
Days with gales	53	0.5	0.6	0.5	0.2	0.0	0.1	0.1	0.1	0.5	0.4	0.4	0.3	3.7
Days with fog	56	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2

[a] 9 a. m., 3 p. m., 9 p. m.

[b] For the period 1907–1915. Complete record for later years not available. "Hurricane wind 100 miles southeast to southwest" on Sept. 15, 1921 and "Wind 100 miles northwest and west" on Sept. 21, 1922.

BAHAMA ISLANDS

Nassau (25° 5′ N., 77° 21′ W., elevation 12 feet) lies near the middle of this region, and the statement of conditions there may be taken as typical of the entire group of islands, except, perhaps, in regard to precipitation.

The mean annual temperature at Nassau is 77°; the highest monthly mean is 82° in August and the lowest 71° in January. The extreme range in temperature is approximately from 95° to 50°. Relative humidity and cloudiness show but little change from month to month, but the precipitation is rather unevenly distributed. For the period May–October the mean monthly rainfall is over 6 inches, while for the remainder of the year it is only 2 inches. Southeast winds prevail from May to August, or approximately during the period of heavier precipitation; northeast winds, somewhat stronger, prevail in the other months.

A very interesting paper on meteorological conditions at Nassau appears in the Quarterly Journal of the Royal Meteorological Society (London) for January, 1921. In addition to the climatic summary given there the author, C. E. P. Brooks, includes the monthly rainfall record for the period 1852–1919, compiled in part from the British publication previously mentioned in relation to early data for the Bermuda Islands.

TABLE 11.—*Nassau, New Providence*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	15	76.0	76.6	78.3	79.9	83.3	85.8	87.5	88.3	87.2	85.0	80.0	77.6	82.1
Mean minimum	15	66.6	66.5	68.0	69.4	72.4	74.7	75.9	76.5	75.8	74.6	71.2	68.6	71.7
Mean	15	71.3	71.6	73.2	74.6	77.8	80.2	81.7	82.4	81.5	79.8	75.6	73.1	76.9
Highest	15	85	85	86	90	90	92	93	94	92	92	89	85	94
Lowest	15	51	54	55	58	65	63	67	67	65	65	56	53	51
Relative humidity														
Mean, 8 a., 3 p	24	76	74	71	71	73	73	72	72	73	74	74	75	73
Cloudiness														
Mean, 8 a., 3 p	44	5.4	5.3	5.1	5.2	6.0	6.2	5.9	5.9	5.9	5.9	5.4	5.3	5.6
Precipitation														
Mean	56	2.17	1.61	1.59	2.63	5.66	6.79	5.77	6.66	7.54	6.24	2.84	1.49	50.99
Maximum in 24 hours	52	4.50	2.74	2.46	2.88	7.44	5.37	4.38	6.37	6.54	*8.00	7.41	2.37	*8.00
Days with rains	52	9	7	6	6	11	13	16	16	17	14	9	8	132
Wind														
Prevailing direction, 2 observations	44	ne.	ne.	ne.	ne.	se.	se.	se.	se.	ne.	ne.	ne.	ne.	ne
Mean hourly velocity	34	9.0	9.0	9.0	9.0	7.0	6.0	6.0	6.0	6.0	8.0	9.0	9.0	8.0
Days with gales	52	0.5	0.5	0.3	0.3	0.2	0.0	0.0	0.2	0.3	0.3	0.5	0.5	3.6
Days with fog	52	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5

* Estimated; gage blown away in hurricane; next highest amount for October was 6.15 inches.

TURKS ISLAND

The somewhat broken record of rainfall for the station at Grand Turk (21° 21′ N., 71° 7′ W., elevation 12 feet) covers the period from 1880 to 1924; data for other meteorological elements are available for the periods 1900–1908 and 1916–1924, the latter being chosen as the basis of the table.

This station lies about 5 degrees south of Nassau and has a mean annual temperature 2° higher (79°). The observed absolute extremes of temperature are 92° and 60°. The yearly rainfall is much lighter than at Nassau —29 inches as compared to 51 inches. The monthly amounts of precipitation show a rather uniform march, with maximum of about 4 inches in October and November and minimum of 1 inch in March.

TABLE 12.—*Grand Turk, Turks Island*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	9	80.2	80.3	81.1	82.8	84.6	87.0	87.4	88.2	87.1	86.5	83.3	81.7	84.2
Mean minimum	9	69.9	70.1	70.9	72.4	75.3	76.6	77.4	77.9	77.2	76.2	73.3	71.6	74.1
Mean	9	75.0	75.2	76.0	77.6	80.0	81.8	82.4	83.0	82.2	81.4	78.3	76.6	79.1
Highest	9	88	88	90	90	90	91	92	92	92	92	90	89	92
Lowest	9	60	62	60	62	65	66	66	70	70	70	64	62	60
Cloudiness														
Mean	4	5.3	4.4	4.7	4.6	6.2	5.4	5.2	5.2	5.0	5.7	5.6	5.3	5.2
Precipitation														
Mean	40	2.21	1.42	1.11	1.51	2.59	1.58	1.74	2.03	3.22	3.98	4.51	2.75	28.65
Maximum in 24 hours	19	2.20	2.60	2.78	2.03	4.34	3.97	3.67	3.30	2.82	5.34	3.81	2.08	5.34
Days with rain	19	13	8	8	6	8	9	10	12	11	13	14	13	125

CUBA [1]

Temperature.—The lowest mean annual temperature is 73.5° at Camajuani, a few miles inland from the middle of the northern coast; there is a slight increase to 75° at Habana and a further increase to 78° at Pinar del Rio, in the extreme western interior. In the eastern half of the island the mean annual temperature ranges between 76° at Cienfuegos and 79° at Santiago de Cuba. In the warmest season, July and August, the extremes in monthly means are 83° at Pinar del Rio and 78° at Camajuani, in the coolest season, January and February, they are 75° at Santiago de Cuba and 68° at Camajuani. At interior stations maximum temperatures exceed 100° (extreme 104° at Pinar del Rio), while 95° is the highest reading for the coast stations of Habana and Cienfuegos. From June to October minimum temperatures are generally between 62° and 68°; in December–February they occasionally fall to 50° or lower, and on very rare occasions to 40 or below (extreme 38° at Moron [2]).

Precipitation.—The mean annual rainfall is generally from 60 to 70 inches in the extreme western province of Pinar del Rio, in the southern part of the Province of Habana, and at Nueva Gerona, on the Isle of Pines. In the Provinces of Matanzas, Santa Clara, and Camaguey it is approximately 50 to 55 inches, while in the Province of Oriente there is a further decrease to 40 to 45 inches. There are some instances of considerable difference in

[1] Reference: *Boletin oficial de la secretaria de agricultura, comercio y trabajo.* Habana.
[2] Station not included in the tables on account of the apparently very inconsistent record. The data for Camajuani are taken as representative of the middle section of the northern coast region.

the amounts of rain received at stations separated by short distances: Bahia Honda and Herradura, in Pinar del Rio (69 and 53 inches), Batabano, and Habana in Habana (65 and 43 inches), Union de Reyes and Matanzas in Matanzas (71 and 51 inches), "Soledad" and "Montserrat" (near Cienfuegos), in Santa Clara (52 and 39 inches), and Firmeza and Guantanamo, in Oriente (58 and 41 inches).

The march of precipitation is as follows: Minimum in January or February, except at a few stations, where slightly lower values are found for December or March, maxima in May or June and in September–November (according to locality) separated by a fairly well marked secondary minimum. In the middle and western provinces there is a very great increase in rainfall from April to June, with monthly means of 9 to 12 inches at nearly all stations. July and August show a considerable decrease from this maximum, but in September and October the averages are comparable with those of June and in some localities they are even greater. In the Province of Oriente the first maximum (secondary) occurs in May and the second (chief) in October or November, when the highest means are generally from 7 to 8 inches. In this region the secondary minimum in July is very pronounced.

In Bulletin No. 1 issued by the Tropical Plant Research Foundation (Washington, D. C.) O. L. Fassig contributes a paper on rainfall and temperature of Cuba, which presents in much detail the data collected by the National Observatory of Cuba.

Most of the stations in the following tables have low elevations; the highest are Camaguey and Camajuani, at 345 and 325 feet, respectively.

It is necessary to note that the means of temperature and precipitation for some stations are based on records that are much broken. It may be assumed, however, that the length of record for these stations is such as to give values that are comparable with those for stations where the series is uninterrupted or consists of rather long divisions.

TABLE 13.—*Temperature data for Cuba.* (°F.)

MEAN MAXIMUM TEMPERATURE

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pinar del Rio	20	79.2	80.4	83.5	86.4	89.2	89.2	90.5	90.5	88.9	86.2	82.2	79.7	85.2
Habana *	21	76.1	76.8	78.3	80.1	82.4	83.3	84.0	84.2	83.5	81.9	78.8	77.0	80.5
Nueva Gerona	9	80.6	80.2	83.8	86.7	88.0	87.8	89.1	88.6	88.0	85.8	82.4	80.8	85.2
Cienfuegos, Soledad	17	79.0	80.6	83.7	86.0	87.6	88.0	89.2	88.5	87.6	85.3	81.5	79.5	84.7
Cienfuegos, Montserrat b	11	79.2	79.5	81.5	83.1	84.6	84.7	87.3	87.8	86.4	85.3	81.3	80.1	83.4
Camajuani	16	77.0	78.4	81.9	83.1	86.2	88.0	88.5	88.9	86.9	84.4	79.7	77.9	83.4
Camaguey	13	80.6	83.1	86.2	88.5	88.9	89.4	91.2	91.2	89.6	87.3	84.2	82.2	86.9
Preston	10	80.4	81.1	82.0	82.8	85.6	87.6	88.7	88.9	89.2	88.0	84.0	82.0	85.0
Santiago de Cuba	16	82.6	82.6	83.8	85.1	86.0	87.3	89.1	89.6	88.2	87.1	84.7	83.3	85.8

MEAN MINIMUM TEMPERATURE

Pinar del Rio	20	63.7	63.9	65.8	68.2	72.1	73.9	75.0	74.8	74.1	72.7	67.8	65.3	69.8
Habana *	21	63.5	63.0	65.8	68.5	72.0	73.9	74.5	74.8	74.5	72.5	67.6	63.9	69.5
Nueva Gerona	9	66.2	63.5	66.9	69.4	72.3	74.3	74.7	74.8	73.4	72.5	70.0	67.1	70.4
Cienfuegos, Soledad	17	60.1	60.4	62.8	65.1	68.7	71.1	71.4	71.4	70.2	69.4	64.0	62.4	66.4
Cienfuegos, Montserrat b	11	64.4	63.0	64.8	67.8	70.7	73.0	73.2	73.4	72.7	71.6	67.6	65.1	68.9
Camajuani	16	58.3	57.9	59.4	61.9	65.5	66.4	67.6	68.0	67.5	66.7	63.3	60.4	63.6
Camaguey	13	62.6	63.5	65.5	67.5	70.0	71.2	72.0	72.1	71.2	69.8	67.1	64.0	68.0
Preston	10	66.9	66.4	67.6	69.4	71.2	72.3	73.0	73.4	72.7	72.3	70.9	68.0	70.3
Santiago de Cuba	16	68.2	67.6	69.4	71.2	73.4	74.1	74.7	74.7	73.9	72.9	70.7	69.1	71.7

* For the period beginning June, 1899. There were some slight changes in elevation in the earlier years; since April, 1908, this has been practically the same as at present—*Casa Blanca*, 49 feet.

b Values for Montserrat, Cienfuegos, are means for 6 a. m. and 2 p. m.

TABLE 13.—*Temperature data for Cuba.* (°F.)—Continued

MEAN TEMPERATURE

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pinar del Rio	20	71.4	72.2	74.6	77.3	80.6	81.6	82.8	82.6	81.5	79.4	75.0	72.5	77.6
Habana *	21	69.8	69.9	72.0	74.3	77.2	78.6	79.2	79.5	79.0	77.2	73.2	70.4	75.0
Nueva Gerona	9	73.4	71.8	75.4	78.0	80.2	81.0	81.9	81.7	80.7	79.2	76.2	74.0	77.8
Cienfuegos, Soledad	17	69.6	70.5	73.2	75.6	78.2	79.6	80.3	80.0	78.9	77.4	72.8	71.0	75.6
Cienfuegos, Montserrat b	11	71.8	71.2	73.2	75.4	77.6	78.8	80.2	80.6	79.6	78.4	74.4	72.6	76.2
Camajuani	16	67.6	68.2	70.6	72.5	75.8	77.2	78.0	78.4	77.2	75.6	71.5	69.2	73.5
Camaguey	13	71.6	73.3	75.8	78.0	79.0	80.3	81.6	81.6	80.4	78.6	75.6	73.1	77.4
Preston	10	73.6	73.8	74.8	76.1	78.4	80.0	80.8	81.2	81.0	80.2	77.4	75.0	77.7
Santiago de Cuba	16	75.4	75.1	76.6	78.2	79.7	80.7	81.9	82.2	81.0	80.0	77.7	76.2	78.7

HIGHEST TEMPERATURE

Pinar del Rio	20	89	92	94	99	104	101	104	100	98	96	91	89	104
Habana	21	89	88	90	92	93	94	93	93	95	93	91	89	95
Nueva Gerona	9	90	93	93	97	102	99	99	97	95	97	91	91	102
Cienfuegos, Soledad	17	89	89	89	92	95	97	97	97	96	92	90	89	97
Cienfuegos, Montserrat	11	88	91	92	91	94	94	95	94	95	93	91	89	95
Camajuani	16	89	88	90	95	98	98	97	99	95	91	90	88	99
Camaguey	13	91	94	98	97	102	101	100	100	98	97	93	93	102
Preston	10	90	93	93	93	96	98	98	98	102	98	96	95	102
Santiago de Cuba	16	90	90	92	93	94	95	97	96	97	95	93	93	97

LOWEST TEMPERATURE

Pinar del Rio	20	46	48	49	51	57	66	66	68	64	62	52	47	46
Habana	21	50	51	55	56	59	65	65	67	68	61	56	53	50
Nueva Gerona	9	52	50	52	57	63	68	66	68	68	63	55	52	50
Cienfuegos, Soledad	17	46	46	48	51	57	64	65	65	65	59	53	40	40
Cienfuegos, Montserrat	11	46	45	46	50	56	66	68	67	68	60	52	48	45
Camajuani	16	44	41	46	49	53	59	61	62	61	57	50	40	40
Camaguey	13	46	49	52	51	56	62	67	66	64	62	52	45	45
Preston	10	50	53	58	62	62	64	62	68	66	66	62	56	50
Santiago de Cuba	16	57	59	58	57	65	62	67	68	67	67	61	55	55

* For the period beginning June, 1899. There were some slight changes in elevation in the earlier years; since April, 1908, this has been practically the same as at present—*Casa Blanca*, 49 feet.

b Values for Montserrat, Cienfuegos, are means for 6 a. m. and 2 p. m.

TABLE 14.—*Precipitation data for Cuba*

MEAN PRECIPITATION (INCHES), BY PROVINCES

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pinar del Rio														
Pinar del Rio*	25	1.82	1.74	2.48	2.62	6.97	10.29	6.61	7.01	10.65	7.74	2.46	1.39	61.78
Herradura	15	1.52	1.19	2.33	2.92	5.68	9.42	4.79	5.48	7.58	8.66	2.11	1.28	52.96
Bahia Honda	9	4.36	2.26	3.36	2.61	5.43	8.59	6.76	7.44	9.03	9.40	5.73	3.68	68.65
Habana														
Habana*	25	2.98	1.33	1.78	1.58	4.71	5.26	4.33	4.27	5.18	6.21	3.20	2.17	43.00
Batabano*	25	2.42	2.07	2.53	2.69	7.92	8.13	6.41	8.95	11.77	8.46	2.62	1.28	65.25
Aguacate*	25	2.18	1.85	2.46	2.63	7.75	9.88	7.88	6.37	8.84	6.05	2.84	2.12	60.85
Isle of Pines														
Nueva Gerona*	13	1.47	2.16	2.40	3.93	8.63	11.96	7.58	7.67	11.06	9.93	2.30	1.59	70.68
Matanzas														
Matanzas*	17	2.52	1.36	2.32	2.37	5.94	9.32	4.50	5.40	5.75	6.10	2.61	3.32	51.51
Union de Reyes*	21	0.97	1.86	3.07	2.96	10.17	12.21	8.35	8.82	10.48	8.16	2.16	1.42	70.63
Banaguises*	21	1.17	1.79	2.48	2.84	6.45	9.36	7.02	7.30	9.02	5.32	2.28	1.58	56.61
Santa Clara														
Sierra Morena	14	2.48	1.04	2.07	1.68	4.33	9.25	4.39	6.27	5.17	6.29	3.90	2.39	49.26
Cienfuegos, Soledad*	25	1.26	1.44	1.87	2.29	6.44	7.63	6.18	6.48	8.04	7.32	2.14	1.25	52.34
Cienfuegos, Montserrat	11	0.69	0.84	1.33	1.49	4.21	5.82	5.05	4.97	5.77	5.46	2.25	0.87	38.75
Cruces*	21	1.38	1.65	2.06	3.03	6.69	8.89	5.98	7.58	9.04	6.11	2.32	2.06	56.79
San Antonio	25	1.47	0.93	1.98	2.88	7.46	8.96	5.29	5.84	6.87	7.24	4.12	2.65	55.69
Camajuani*	21	2.05	1.12	1.47	2.93	6.41	9.33	5.24	5.44	6.39	7.13	4.90	2.83	55.24
Yaguajay*	18	2.05	1.43	2.18	3.09	6.01	8.89	4.60	6.11	7.95	6.88	5.25	2.20	56.64

* Data furnished by San Juan (Porto Rico) office of the U. S. Weather Bureau.

TABLE 14.—*Precipitation data for Cuba*—Continued

MEAN PRECIPITATION (INCHES), BY PROVINCES—Continued

Stations	Length of record, years	January	February	Mrch	April	May	June	July	August	September	October	November	December	Annual
Camaguey														
Ciego de Avila*	16	1.03	1.19	1.26	1.96	5.44	9.41	5.28	5.21	7.87	6.20	2.58	0.56	47.99
Ceballos	15	1.48	0.73	1.01	2.30	7.99	8.71	4.90	5.52	7.67	7.47	2.76	0.87	51.41
Camaguey*	20	1.54	1.40	2.43	3.64	7.62	10.52	5.60	5.54	7.26	5.44	3.12	1.96	56.07
La Gloria*	17	2.72	1.30	1.64	3.63	7.97	5.84	3.73	3.51	6.40	7.37	5.79	2.38	52.28
Nuevitas	11	2.21	1.17	1.93	4.41	5.04	3.93	3.06	2.65	4.90	5.06	6.51	3.06	43.93
Oriente														
Manzanillo*	14	0.60	0.84	2.15	2.98	7.48	9.06	5.67	5.79	8.08	6.83	2.55	1.25	53.28
Gibara*	20	2.96	1.42	1.40	2.07	6.08	3.73	1.74	2.75	4.47	7.21	7.95	3.18	44.96
Banes	13	3.54	1.76	2.17	4.06	4.66	2.91	1.62	2.49	4.03	5.72	7.65	4.73	45.34
Preston*	17	4.03	2.21	1.25	2.88	4.65	2.36	1.50	2.08	3.88	6.42	8.21	5.31	44.81
Santiago de Cuba*	21	1.47	0.87	1.72	3.32	6.45	5.39	2.26	3.58	6.66	7.40	3.61	1.06	43.79
Firmeza	22	1.36	1.28	2.52	4.30	8.02	4.93	3.90	6.17	9.04	11.04	3.66	1.44	57.66
Guantanamo	23	0.72	1.03	2.06	3.43	6.45	4.52	3.01	3.36	6.06	6.98	2.27	1.10	40.99

MAXIMUM PRECIPITATION IN 24 HOURS (IN INCHES)

Pinar del Rio	19	3.54	2.83	5.16	2.76	5.00	5.20	2.17	3.62	12.68	8.46	17.99	3.98	17.99
Habana	21	6.68	3.07	1.89	3.70	5.47	3.76	2.80	3.15	3.39	10.33	7.04	2.53	10.33
Nueva Gerona	10	1.85	3.46	3.46	4.55	3.65	4.51	2.53	3.60	6.85	6.40	3.85	2.78	6.85
Cienfuegos Soledad	20	2.18	1.61	1.50	2.50	3.60	8.80	3.25	4.10	7.20	6.50	8.00	2.00	8.80
Camajuani	17	1.33	1.30	1.83	2.88	3.82	5.10	2.65	3.34	3.39	4.19	8.67	2.65	8.67
Camaguey	17	1.97	2.64	11.81	4.60	6.14	4.88	4.21	4.37	4.13	4.29	7.68	3.37	11.81
Preston	12	5.24	2.84	1.50	5.20	2.82	4.02	2.40	2.15	2.60	7.44	4.70	7.80	7.80
Santiago de Cuba	16	3.45	1.02	1.57	3.94	4.53	7.28	6.23	4.38	14.34	8.62	5.10	2.14	14.34

* Data furnished by San Juan (Porto Rico) office of the U. S. Weather Bureau.

TABLE 14.—*Precipitation data for Cuba*—Continued

MEAN NUMBER OF DAYS WITH PRECIPITATION

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Pinar del Rio	23	4	4	5	4	11	14	13	13	14	11	4	3	110
Habana	24	7	5	5	4	8	11	9	11	12	13	9	7	101
Nueva Gerona	12	3	4	5	6	12	17	14	14	16	14	3	3	111
Cienfuegos, Soledad	21	3	2	4	4	10	13	13	13	14	11	4	3	94
Camajuani	20	7	4	5	6	11	14	11	10	14	15	10	8	115
Camaguey	18	5	8	6	6	12	15	11	11	13	13	9	5	114
Preston	14	11	7	5	7	8	5	5	5	9	10	11	10	93
Santiago de Cuba	17	4	3	4	6	10	10	8	10	11	14	7	5	92

In the general tables Habana is represented by the series of observations beginning in June, 1899. In addition to this series there is available the much longer one at the Belen Observatory, which has been summarized to include the year 1914 in Proceedings of the Second Pan American Scientific Congress, Vol. II, p. 132. That paper, by P. Mariano Gutierrez-Lanza, is the basis of the table for Habana. The observations at Montserrat furnish a valuable series for Cienfuegos for the period of 11 years—1911–1921.

These stations are situated as follows: Belen Observatory, Habana, 23° 8′ N., 82° 21′ W., elevation 80 feet; Montserrat Observatory, Cienfuegos, 22° 9′ N., 80° 27′ W., elevation 98 feet.

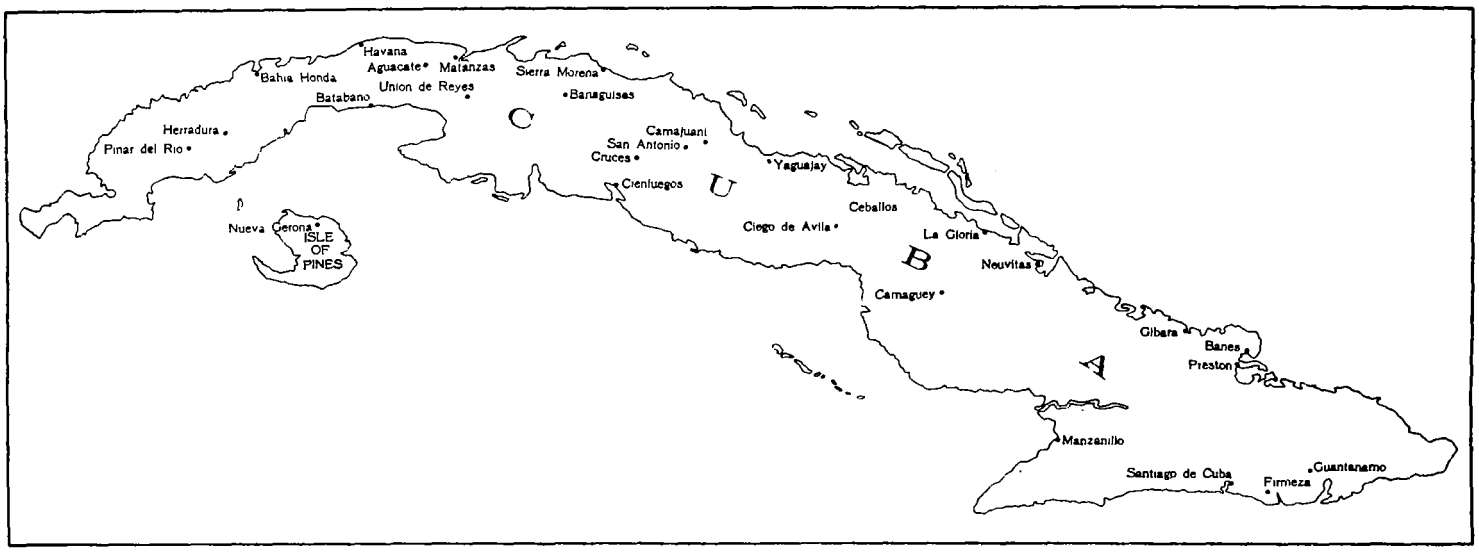


TABLE 15.—*Habana (Belen), Cuba*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean, 2 p	18	75.2	76.5	78.8	80.1	82.2	83.7	84.9	85.5	84.2	82.0	78.8	76.6	80.7
Mean, 6 a	18	65.8	65.8	67.5	69.8	72.7	75.0	75.6	75.6	75.0	73.9	70.2	67.6	71.2
Mean, 6 a., 2 p	18	70.5	71.2	73.2	75.0	77.4	79.4	80.2	80.6	79.6	78.0	74.5	72.1	76.0
Mean bihourly readings	18	70.3	70.9	73.2	75.2	77.7	79.5	80.4	80.6	79.9	78.1	74.3	71.8	76.6
Highest	25	89	91	91	94	93	96	93	95	94	94	90	90	96
Lowest	25	50	50	53	55	59	66	66	68	67	62	55	53	50
Relative humidity														
Mean, 6 a., 2 p., 8 p	43	75	74	72	72	75	78	77	78	80	78	76	75	76
Mean bihourly readings [a]	43	74	72	70	69	72	75	73	75	78	77	75	74	74
Precipitation														
Mean	63	2.84	1.84	1.92	2.28	4.45	6.46	4.87	5.48	5.78	6.57	3.15	2.44	48.08
Maximum in 24 hours	53	6.43	3.13	3.30	8.30	6.27	4.78	4.07	4.44	3.76	6.53	7.56	3.47	8.30
Days with rain	46	8	6	5	5	10	14	12	14	15	15	10	9	123
Days with thunderstorm	20	1	1	2	3	7	13	15	16	12	6	1	1	78
Wind														
Prevailing direction	11	n.	ene.	ene.	ene.	ene.	e.	e.	e.	e.	nne.	ene.	ene.	ene.
Mean hourly velocity	41	7.3	7.4	7.8	7.8	6.8	5.9	5.6	5.4	5.4	7.2	7.6	7.4	6.8
Maximum velocity [b]	45	56	72	67	58	63	58	58	67	101	134	78	58	134
Days with gales [c]	11	2.4	1.7	1.7	2.8	0.9	0.5	0.8	0.7	1.1	0.5	2.0	0.7	15.8
Days with fog	30	1.0	2.0	2.0	1.0	1.0	0.5	0.3	0.4	0.4	0.6	0.5	1.0	10.7

[a] Bihourly readings, except for 12 p. m., and 2 a. m.
[b] The dates of occurrence of gales of hurricane force (with velocities in miles per hour) are as follows: Sept. 5, 1888, 94; Sept. 24, 1894, 101; Oct. 11, 1909, 134; Oct. 17, 1910, 101.
[c] These data are for the period 1911–1921; values for the preceding decade are considerably higher (annual mean about 30).

TABLE 16.—*Cienfuegos (Montserrat), Cuba*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean, 2 p	11	79.2	79.5	81.5	83.1	84.6	84.7	87.3	87.8	86.4	85.3	81.3	80.1	83.4
Mean, 6 a	11	64.4	63.0	64.8	67.8	70.7	73.0	73.2	73.4	72.7	71.6	67.6	65.1	68.9
Mean, 6 a., 2 p	11	71.8	71.2	73.2	75.4	77.6	78.8	80.2	80.6	79.6	78.4	74.4	72.6	76.2
Highest	11	88	91	92	91	94	94	95	94	95	93	91	89	95
Lowest	11	46	45	46	50	56	66	68	67	68	60	52	48	45
Relative humidity														
Mean, 6 a., 2 p., 8 p	11	75	74	73	72	75	79	77	78	81	81	79	78	77
Precipitation														
Mean	11	0.69	0.84	1.33	1.49	4.21	5.82	5.05	4.97	5.77	5.46	2.25	0.87	38.75
Maximum in 24 hours	11	0.95	1.04	1.85	1.34	3.34	4.45	2.40	2.08	2.40	4.53	4.30	1.68	4.53
Days with rain	11	4	3	5	5	10	14	14	16	15	13	5	3	107
Days with thunderstorm	11	(a)	1	3	4	9	16	20	20	16	9	2	1	101
Wind														
Prevailing direction	11	ne.	ne.	ssw.	ssw.	ssw.	ssw.	ne.	ne.	ssw.	ne.	ne.	ne.	ne.
Mean hourly velocity	11	6.5	6.2	5.9	6.4	5.2	5.2	5.0	5.1	4.8	5.0	6.6	6.1	5.7
Days with gales	7	0.0	0.6	0.0	0.0	0.3	0.4	0.1	0.6	0.6	0.0	0.6	0.0	3.2
Days with fog	7	1.9	1.6	1.6	0.4	0.4	0.1	0.0	0.0	0.1	0.6	0.1	0.7	7.5

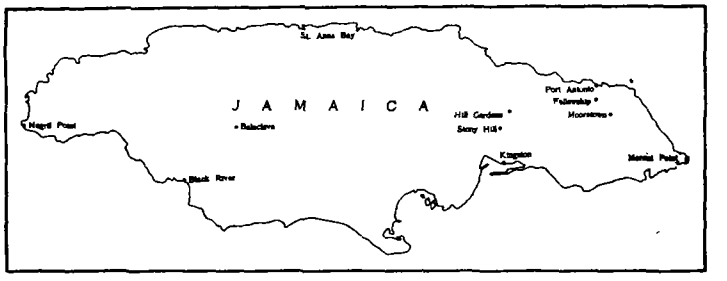
[a] Total for 11 years—January, 2.

JAMAICA

The distribution of stations at different elevations from near sea level to nearly 5,000 feet furnishes very interesting temperature data. Table 17 sets forth the main features relative to change in temperature with increased elevation.

TABLE 17.—*Mean annual temperatures at different elevations in Jamaica. (°F.). 16-year record*

Stations	Elevation	Mean Maximum	Mean Minimum	Mean
	Feet	*°F.*	*°F.*	*°F.*
Kingston	24	87.9	71.2	79.6
Hope Gardens	668	87.3	67.3	77.3
Stony Hill	1,400	82.5	66.3	74.4
Hill Gardens	4,900	68.4	56.0	62.2



Temperature.—Near sea level the mean annual temperature is 79° and it ranges down to 62° for the 5,000-foot level; for the warmest month this change in mean is from 82° to 65° and for the coldest from 77° to 59°. The maximum temperature observed near sea level is 98° (Kingston) and that for Hill Gardens, 80°; the minima are 57° and 44°, respectively.

Table 19, below, gives mean and extreme temperatures for six stations. All data refer to the period 1908–1923.

Relative humidity.—The mean annual relative humidity is 73 per cent at Kingston on the leeward coast, 82 per cent at Stony Hill (1,400 feet) and 87 per cent at Hill Gardens (4,900 feet). At the first two stations there is a considerable increase in relative humidity from the minima of July to the maxima of October–November, but at the third station the means show almost no change from month to month. The amplitude of daily variation as shown by means for 7 a. m. and 3 p. m. is moderately large at Kingston, but it is practically zero at Hill Gardens. Monthly and annual means appear in Table 20.

Precipitation.—The contrast in amount of precipitation received in different parts of the island is very striking. At Kingston, to leeward of the high Blue Mountains, the mean annual rainfall is only 32 inches; on the southwest coast (Black River), at the western extremity (Negril Point) and along the western half of the northern coast (St. Anns Bay) it amounts to 50–60 inches; at the eastern extremity (Morant Point) there is an increase to about 70 inches; in the west central region (Balaclava) a further rise to 80 inches. This progression continues as we enter the mountains and windward regions north and northeast of Kingston; here we find the following annual totals: One hundred and five inches at Hill Gardens, 140 inches at Port Antonio, 166 inches at Shrewsbury, 187 inches at Fellowship, and lastly the unusually heavy amount of 222 inches at Mooretown, in the valley of the Rio Grande, about 30 miles from Kingston.

The maximum rainfall occurs in October or November and the minimum from January to March. At Kingston the respective monthly averages for these periods are 7 and 1 inches, while at Mooretown they are 35 and 10 inches.

The rainfall normals in Table 20 are from "The Rainfall of Jamaica, 1870–1919," by Maxwell Hall; the maximum 24-hour amounts and the mean number of days with rain are compiled from the Jamaica Weather Report.

The following data relative to rainfall at Mooretown are of special interest. The total annual rainfall exceeded 300 inches in 1904 (320.84) and again in 1915 (309.03); monthly totals of 60 inches and over were recorded for November in the years 1899, 1901, 1904, and 1915, and for May in the year 1918, the extreme record being 69.36 inches in November, 1901. Twenty-four-hour amounts of more than 10 inches appear in the record for each month of the year except August; the torrential fall of 21 inches on November 26, 1904, is the maximum.

The amounts of rainfall at Silver Hill and Farm Hill (15 miles northeast of Kingston) in November, 1909, give a record for excessive precipitation that ranks with the highest for any region of the earth. The data in Table 17 are taken from Symons's Meteorological Magazine, June, 1910.

Precipitation of this character is limited almost entirely to the mountainous northeastern part of the island. In the Kingston record (1870–1924) there are a few instances in which the monthly rainfall was over 20 inches and some in which the 24-hour amount was 6 inches or more.

TABLE 18.—*Torrential precipitation in Jamaica in November, 1909*

Date	Silver Hill	Farm Hill	Radnor	Date	Silver Hill	Farm Hill	Radnor
	Inches	*Inches*	*Inches*		*Inches*	*Inches*	*Inches*
Nov. 4	6.50	4.20	(?)	Nov. 8	18.00	21.00	25.00
5	21.00	7.70	(?)	9	18.00	22.58	24.40
6	30.50	23.80	(?)	10	8.00	----------	28.00
7	27.00	38.50	(?)	11	6.00	6.62	(?)

TABLE 19.—*Temperature data for Jamaica.* (°F.)

MEAN MAXIMUM TEMPERATURE

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Morant Point	16	81.2	81.3	81.9	83.0	84.4	85.4	86.0	86.5	86.7	85.8	83.7	82.2	84.0
Kingston	16	86.0	86.0	86.6	87.1	87.5	88.9	90.3	90.3	90.0	88.7	87.1	86.6	87.9
Negril Point	16	84.3	83.9	84.5	85.4	85.7	87.1	88.2	88.0	87.7	86.9	85.9	85.3	86.1
Hope Gardens	16	84.9	85.0	85.6	86.0	87.1	89.0	91.0	90.0	89.1	87.5	85.9	86.0	87.3
Stony Hill	16	79.9	80.5	81.2	82.0	82.6	84.4	85.8	85.0	83.6	82.9	81.1	80.8	82.5
Hill Gardens	16	65.6	65.4	66.4	67.4	68.4	69.9	72.0	71.9	70.6	69.0	67.3	66.7	68.4

MEAN MINIMUM TEMPERATURE

Morant Point	16	73.4	73.0	72.4	72.9	75.3	77.6	78.2	78.0	77.0	75.6	75.1	74.5	75.2
Kingston	16	67.8	67.6	68.4	70.3	72.4	73.5	73.5	73.6	73.5	73.0	71.2	69.2	71.2
Negril Point	16	68.3	67.7	68.1	70.1	71.8	72.6	72.5	72.6	73.1	72.8	71.4	69.7	70.9
Hope Gardens	16	64.2	63.8	64.7	66.5	68.1	69.1	69.3	70.1	70.1	69.1	67.5	65.4	67.3
Stony Hill	16	64.1	63.3	64.1	65.1	66.8	67.7	68.2	68.1	68.2	68.0	67.0	65.4	66.8
Hill Gardens	16	53.2	53.1	53.9	54.8	56.7	57.9	58.3	58.1	58.3	57.5	56.1	54.3	56.0

MEAN TEMPERATURE

Morant Point	16	77.3	77.2	77.2	78.0	79.8	81.5	82.1	82.2	81.8	80.7	79.4	78.4	79.6
Kingston	16	76.9	76.8	77.5	78.7	80.0	81.2	81.9	82.0	81.8	80.8	79.2	77.9	79.6
Negril Point	16	76.3	75.8	76.3	77.8	78.8	79.8	80.4	80.3	80.4	79.8	78.6	77.5	78.5
Hope Gardens	16	74.6	74.4	75.2	76.2	77.6	79.0	80.2	80.0	79.6	78.3	76.7	75.7	77.3
Stony Hill	16	72.0	71.9	72.6	73.5	74.7	76.0	77.0	76.6	75.9	75.4	74.0	73.1	74.4
Hill Gardens	16	59.4	59.2	60.2	61.1	62.6	63.9	65.2	65.0	64.4	63.2	61.7	60.5	62.2

HIGHEST TEMPERATURE

Morant Point	16	88	87	86	86	88	88	89	89	92	88	87	86	92
Kingston	16	92	92	92	94	94	95	95	98	96	95	93	92	98
Negril Point	16	90	89	90	91	92	92	93	92	92	93	94	92	94
Hope Gardens	16	93	91	92	93	94	95	97	97	96	94	93	92	97
Stony Hill	16	90	90	90	92	91	92	93	93	91	91	91	91	93
Hill Gardens	16	71	72	74	75	76	77	79	79	80	76	73	74	80

LOWEST TEMPERATURE

Morant Point	16	57	58	61	61	64	70	68	68	63	65	64	62	57
Kingston	16	57	60	62	64	66	68	68	70	69	68	62	62	57
Negril Point	16	57	61	62	63	61	66	68	69	69	68	62	62	57
Hope Gardens	16	57	58	59	60	61	62	61	64	64	62	60	55	55
Stony Hill	16	54	56	57	60	63	64	64	62	63	63	62	59	54
Hill Gardens	16	45	44	47	50	51	53	54	53	54	53	49	47	44

TABLE 20.—*Mean relative humidity (per cent), Jamaica*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Kingston:														
7 a. m.	16	83	82	81	78	77	77	77	78	82	86	86	85	81
3 p. m.	16	62	62	62	65	69	67	64	67	69	71	69	64	66
Mean	16	73	72	71	71	73	72	70	73	76	78	77	74	73
Stony Hill:														
7 a. m.	16	88	88	86	87	88	87	85	86	86	89	90	89	87
3 p. m.	16	77	73	72	76	80	75	70	74	78	81	81	78	76
Mean	16	82	81	79	81	84	81	78	80	82	85	85	84	82
Hill Gardens:														
7 a. m.	16	86	85	86	85	85	86	84	84	85	87	88	86	86
3 p. m.	16	87	87	86	89	88	88	87	85	89	91	91	89	88
Mean	16	86	86	86	87	86	87	86	84	87	89	90	88	87

TABLE 21.—*Precipitation data for Jamaica*

MEAN PRECIPITATION (IN INCHES)

Stations	Length of record, years	January	Feb-uary	March	April	May	June	July	August	Sep-tember	October	Novem-ber	Decem-ber	Annual
Kingston	53	0.92	0.67	0.96	1.18	4.16	4.00	1.53	3.37	4.42	6.96	2.80	1.55	32.52
Black River	46	1.67	1.69	2.64	4.20	6.89	3.82	4.70	6.32	5.47	8.38	4.34	2.31	52.43
Negril Point	25	1.41	1.74	2.59	2.92	6.19	5.49	5.70	7.02	6.91	8.11	4.30	2.11	54.49
St. Anns Bay	28	4.97	4.76	2.85	4.16	5.69	4.03	3.01	2.91	3.47	6.93	10.13	7.84	60.75
Morant Point	50	4.38	2.89	2.15	3.53	9.35	6.21	3.40	5.25	7.02	11.66	8.24	6.11	70.19
Balaclava	27	1.94	2.21	4.89	10.10	12.78	4.84	4.67	7.45	11.01	12.73	6.30	2.61	81.53
Hill Gardens	49	6.98	4.07	4.88	5.98	10.43	7.62	3.64	8.38	9.84	17.20	16.16	10.30	105.48
Port Antonio	36	8.78	6.04	4.76	6.85	15.62	16.68	10.84	11.35	10.64	15.19	16.99	13.57	137.31
Shrewsbury [a]	23	17.08	11.36	8.52	10.30	14.84	11.98	9.29	8.71	9.25	13.35	30.70	21.12	166.50
Fellowship	28	13.08	10.47	7.31	10.29	18.54	20.08	15.06	14.01	13.12	17.63	27.59	20.04	187.22
Mooretown	24	17.48	12.92	9.78	11.76	18.97	21.77	17.72	15.54	15.39	19.92	34.65	26.08	221.98

MAXIMUM PRECIPITATION IN 24 HOURS (IN INCHES)

Kingston	30	1.52	1.82	1.28	1.78	6.84	6.27	4.40	3.12	6.45	6.49	8.93	3.62	8.93
Black River	26	2.72	[b]	[b]	3.41	3.88	3.60	4.23	4.50	5.48	6.62	3.70	3.69	6.62
Negril Point	29	3.39	[b]	[b]	3.35	6.59	5.53	3.53	5.70	9.07	9.05	12.79	[b]	12.79
St. Anns Bay	29	5.20	4.85	4.60	4.84	4.64	5.55	3.36	[b]	3.18	4.47	6.10	6.10	6.10
Morant Point	29	8.29	3.32	4.70	5.82	8.95	8.33	4.95	5.83	5.90	10.16	12.00	5.96	12.00
Balaclava	29	3.25	3.30	4.55	5.20	5.22	4.21	3.24	5.97	6.18	8.00	4.47	2.82	8.00
Hill Gardens	29	8.55	6.77	5.04	4.40	28.66	8.40	4.01	16.22	11.25	13.85	18.30	10.75	28.66
Port Antonio	29	6.18	7.49	4.07	7.47	14.51	15.70	9.84	10.93	10.47	11.04	16.12	18.26	18.26
Mooretown	15	10.68	11.05	10.02	10.60	15.42	13.12	10.10	7.65	10.00	11.15	21.00	11.50	21.00

MEAN NUMBER OF DAYS WITH PRECIPITATION

Kingston	25	5	3	5	5	7	6	5	8	9	11	7	5	76
Black River	15	7	6	9	10	12	8	10	14	12	14	10	6	118
Negril Point	15	7	8	10	9	14	14	14	15	15	14	10	8	138
St. Anns Bay	15	13	9	8	9	10	8	7	10	9	12	15	15	125
Morant Point	15	14	11	13	12	16	13	13	16	16	20	17	16	177
Balaclava	15	6	6	8	12	14	8	8	12	16	15	11	5	121
Hill Gardens	11	12	10	11	10	13	7	6	10	13	18	17	12	139
Port Antonio	15	16	13	12	11	15	16	14	17	12	15	17	16	174
Mooretown	15	16	13	13	12	14	17	16	15	13	14	17	18	178

[a] This station is in the vicinity of Port Antonio; exact location not available.
[b] Amount not in excess of 2.50 inches.

The following table for Kingston (18° 1′ N., 76° 48′ W., elevation 24 feet) is based mainly on the later series of observations beginning with the year 1908.

TABLE 22.—*Kingston, Jamaica*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	16	86.0	86.0	86.6	87.1	87.5	88.9	90.3	90.3	90.0	88.7	87.1	86.6	87.9
Mean minimum	16	67.8	67.6	68.4	70.3	72.4	73.5	73.5	73.6	73.5	73.0	71.2	69.2	71.2
Mean	16	76.9	76.8	77.5	78.7	80.0	81.2	81.9	82.0	81.8	80.8	79.2	77.9	79.6
Highest	16	92	92	92	94	94	95	95	98	96	95	93	92	98
Lowest	16	57	60	62	64	66	68	68	70	69	68	62	62	57
Relative humidity														
Mean, 7 a., 3 p	16	73	72	71	71	73	72	70	73	76	78	77	74	73
Cloudiness														
Mean, 7 a., 3 p	16	4.3	4.4	4.6	5.0	5.7	6.0	5.2	5.8	6.2	6.3	5.9	4.6	5.3
Precipitation														
Mean	53	0.92	0.67	0.96	1.18	4.16	4.00	1.53	3.37	4.42	6.96	2.80	1.55	32.52
Maximum in 24 hours	30	1.52	1.82	1.28	1.78	6.84	6.27	4.40	3.12	6.45	6.49	8.93	3.62	8.93
Days with rain	25	5	3	5	5	7	6	5	8	9	11	7	5	76
Days with thunder storms	5	1	1	[b]	[b]	6	6	8	10	12	5	2	3	54
Wind														
Prevailing direction:														
7 a. m.	16	nne.	n.	nne.	ne.	ne.	ene.	ne.	ne.	ne.	ne.	ne.	nne.	ne.
3 p. m.	16	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.
Mean hourly velocity [a]	16	6.7	7.4	7.7	7.9	8.5	9.8	9.5	8.3	6.8	6.5	6.0	6.1	7.6
Days with gales	37	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.2
Days with fog	37	0	0	0	0	0	0	0	0	0	0	0	0	0

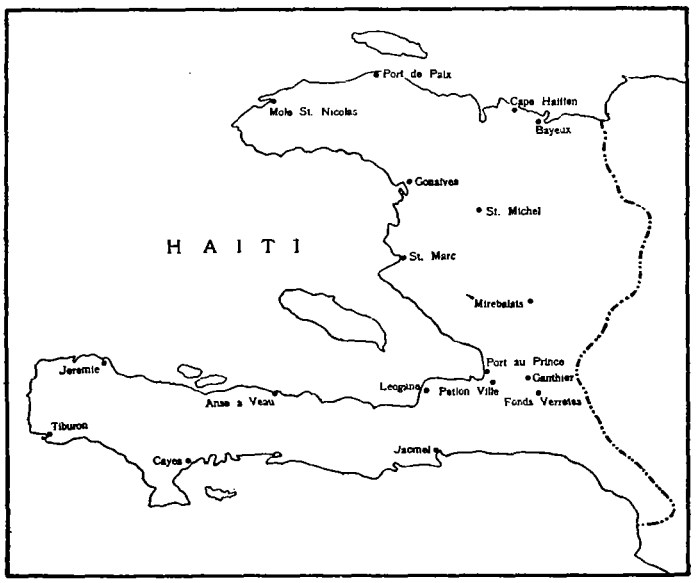
[a] 7 a. m., 4.8 miles per hour, little change during the year; 3 p. m., 13.4 miles per hour, extremes 18.3 in July and 8.9 in November.
[b] Total for 5 years—March, 2; April, 2.

HAITI

In the Republic of Haiti, occupying the western part of the island of Haiti, the distribution of stations with temperature records is rather good, as follows: Port de Paix, Bayeux, and Cap Haitien, on the northern coast; Gonaives and Port au Prince, on the western, and Cayes, on the southern—all near sea level; in the southern interior are Ganthier and Petion Ville at elevations of 351 and 1,312 feet, respectively.

The following data for temperature and other meteorological elements are compiled from the bulletins of the *Séminaire-Collège, St. Martial*, Port au Prince (18° 33′ N., 74° 42′ W.; elevation, 60 feet).

Temperature.—In the west the mean annual temperature is 81° and in the north and south about 77°, while in the elevated interior it is 76°. The range in monthly mean temperature does not exceed 8° at any station. The maximum temperatures observed are 95° or below at Bayeux and Cap Haitien, but rise to about 100° elsewhere; the minimum temperatures are approximately within the limits 60° and 55°.



Precipitation.—North of Port au Prince the annual amounts of precipitation along the coast are very small, falling to 20 inches in the northwest. The eastern half of the northern coastal region receives much more rainfall; on the whole, the annual totals are between 40 and 60 inches, but there are local increases such as 82 inches at Bayeux. In the vicinity of Port au Prince the range in amount of annual rainfall is very striking, although not so marked as was noted for the region near Kingston, Jamaica: Ganthier, 32 inches; Petion Ville, 52 inches; Mirebalais, 103 inches. On the narrow southern peninsula the totals for the year are considerably different, with extremes of 30 and 84 inches at Tiburon and Cayes, both on the southern coast.

As a rule the greatest monthly precipitation occurs in May–June or September–November and the least in January or July; the maximum local monthly average exceeds 15 inches and the minimum falls below 0.50 inch. The extremes in days with rain annually are 135 at Bayeux and 43 at Gonaives. Maximum 24-hour amounts are not unusually high.

TABLE 23.—*Temperature data for Haiti.* (°F.)

MEAN MAXIMUM TEMPERATURE

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Bayeux	6	79.3	79.9	81.3	83.1	84.7	86.7	88.3	88.3	88.0	86.7	83.3	80.4	84.2
Cap Haitien	7	79.9	79.3	80.4	82.0	84.4	86.4	86.7	87.4	87.4	85.5	82.4	80.2	83.5
Cayes	13	82.9	82.4	82.6	82.6	83.7	84.9	85.6	86.2	86.2	85.8	85.5	84.2	84.4
Ganthier	10	84.9	86.2	87.1	88.7	90.1	91.2	92.1	92.7	91.8	89.8	88.2	86.2	89.1
Gonaives	4	88.0	88.2	90.0	90.3	91.8	92.5	92.8	93.2	91.9	91.4	89.4	88.7	90.7
Petion Ville	11	83.7	84.0	85.5	85.8	86.4	87.8	89.8	89.2	87.8	85.8	84.0	82.8	86.0
Port au Prince	20	87.8	88.2	88.9	89.4	89.8	92.1	94.1	93.4	91.4	89.6	87.8	87.4	90.0
Port de Paix	5	81.3	81.3	83.3	86.2	88.5	90.5	90.7	90.1	89.4	89.1	86.7	83.8	86.7

MEAN MINIMUM TEMPERATURE

Bayeux	6	65.3	64.9	65.8	68.4	70.2	71.1	72.0	72.1	71.8	71.1	69.1	66.6	69.0
Cap Haitien	7	66.9	66.7	67.8	69.6	71.4	73.0	73.6	73.8	73.9	72.1	70.5	68.7	70.7
Cayes	13	68.7	68.9	70.0	71.8	73.2	74.7	74.5	74.5	74.1	73.2	72.0	69.6	72.1
Ganthier	10	64.8	66.6	67.5	69.3	71.2	72.1	72.9	72.7	72.0	71.1	69.1	66.6	69.7
Gonaives	4	68.0	67.6	69.4	70.3	72.1	72.7	73.4	72.3	72.1	71.6	71.1	68.0	70.7
Petion Ville	11	63.1	63.7	64.8	66.2	67.8	68.5	68.9	69.3	68.9	68.0	66.9	64.2	66.7
Port au Prince	20	68.2	68.5	69.4	70.9	72.5	73.4	73.8	73.4	72.9	72.1	71.2	69.3	71.3
Port de Paix	5	64.4	64.0	64.6	65.8	68.0	69.4	70.2	70.3	70.3	69.3	67.3	64.8	67.4

MEAN TEMPERATURE

Bayeux	6	72.3	72.4	73.6	75.8	77.4	78.9	80.2	80.2	79.9	78.9	76.2	73.5	76.6
Cap Haitien	7	73.4	73.0	74.1	75.8	77.9	79.7	80.2	80.6	80.6	78.8	76.4	74.4	77.1
Cayes	13	75.8	75.6	76.3	77.2	78.4	79.8	80.0	80.4	80.2	79.5	78.8	76.9	78.2
Ganthier	10	74.8	76.4	77.3	79.0	80.6	81.6	82.5	82.7	81.9	80.4	78.6	76.4	79.4
Gonaives	4	78.0	77.9	79.7	80.3	82.0	82.6	83.1	82.8	82.0	81.5	80.2	78.4	80.7
Petion Ville	11	73.4	73.8	75.2	76.0	77.1	78.2	79.4	79.2	78.4	76.9	75.4	73.5	76.4
Port au Prince	20	78.0	78.4	79.2	80.2	81.2	82.8	84.0	83.4	82.2	80.8	79.5	78.4	80.7
Port de Paix	5	72.8	72.6	74.0	76.0	78.2	80.0	80.4	80.2	79.8	79.2	77.0	74.3	77.0

HIGHEST TEMPERATURE

Bayeux	6	84	84	95	91	91	91	93	93	94	93	93	86	95
Cap Haitien	7	86	87	92	89	89	91	91	91	90	90	89	88	92
Cayes	13	89	89	91	95	90	89	90	99	92	93	92	91	99
Ganthier	10	92	94	96	95	95	98	97	99	99	98	96	92	99
Gonaives	4	93	96	96	96	96	98	100	99	99	96	95	93	100
Petion Ville	11	90	90	92	92	93	93	96	97	95	93	91	90	97
Port au Prince	25	93	95	98	98	99	99	100	100	99	98	96	93	100
Port de Paix	5	90	88	93	93	95	99	97	97	95	95	93	88	99

LOWEST TEMPERATURE

Bayeux	6	57	56	58	61	64	66	68	67	68	68	59	59	56
Cap Haitien	7	59	57	59	61	65	65	68	66	63	64	62	61	57
Cayes	13	59	59	62	65	66	70	71	69	69	69	64	62	59
Ganthier	10	57	57	58	60	63	64	68	67	65	66	60	54	54
Gonaives	4	58	58	64	67	65	68	68	67	67	67	65	61	58
Petion Ville	11	57	54	58	58	59	58	64	64	58	63	59	56	54
Port au Prince	25	62	59	63	61	66	64	68	68	67	66	64	60	59
Port de Paix	5	57	54	55	59	61	64	66	66	64	66	59	57	54

TABLE 24.—*Precipitation data for Haiti*

MEAN PRECIPITATION (IN INCHES)

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Anse a Veau	13	1.53	2.04	2.42	4.55	6.41	5.42	4.38	4.75	4.53	3.56	2.82	1.17	43.58
Bayeux	18	6.59	4.67	4.57	7.28	8.21	4.35	1.80	3.61	5.55	8.76	15.21	11.08	81.68
Cap Haitien	14	4.59	4.84	3.76	2.68	4.83	3.72	1.32	1.69	3.65	9.33	10.39	9.01	59.81
Cayes	16	3.34	3.65	4.68	7.37	12.56	5.66	4.29	8.04	9.67	13.71	7.31	3.66	83.94
Ganthier	24	0.59	0.83	1.66	4.37	5.59	1.85	1.21	2.56	4.71	5.41	2.39	0.98	32.15
Gonaives	20	0.25	0.46	0.58	0.90	2.99	3.85	2.54	2.54	3.29	1.33	1.07	0.41	20.21
Jacmel	17	1.44	2.23	3.87	5.22	8.96	4.06	2.72	4.57	4.76	5.63	2.84	1.12	47.42
Jeremie	16	3.61	3.98	2.60	4.11	6.68	5.37	3.47	4.30	4.32	4.59	4.52	2.61	50.16
Mirebalais	10	0.68	2.02	3.33	6.54	14.47	12.88	11.84	14.23	15.66	12.72	6.18	2.56	103.11
Mole-St.-Nicholas	17	1.60	1.30	1.05	0.94	2.12	1.04	0.94	1.42	2.78	2.78	2.24	1.58	19.79
Petion Ville	24	1.07	1.91	3.70	6.95	8.55	4.35	2.92	4.54	7.73	6.23	2.91	1.07	51.93
Port au Prince	44	1.15	2.41	3.73	6.65	9.42	4.17	2.86	5.30	7.52	6.89	3.61	1.31	55.03
Port de Paix	16	5.33	3.59	2.07	2.59	3.31	3.65	2.11	3.55	5.43	4.69	7.59	5.50	49.41
St. Marc	12	0.43	1.22	0.77	1.35	5.40	5.59	5.52	5.33	5.34	4.11	1.06	0.48	36.60
St. Michel	15	0.35	0.54	1.61	2.75	7.40	8.31	4.33	5.88	6.26	5.45	2.52	1.02	46.42
Tiburon	9	1.73	1.30	2.61	4.49	2.74	0.37	1.55	2.80	4.15	4.32	3.47	1.08	30.61

TABLE 24.—*Precipitation data for Haiti*—Continued

MAXIMUM PRECIPITATION IN 24 HOURS (IN INCHES)

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Cap Haitien	14	4.57	7.32	7.10	3.23	3.00	2.27	2.20	4.25	3.75	5.96	6.28	9.04	9.04
Cayes	14	3.11	4.60	3.84	4.25	7.74	5.93	6.15	8.66	4.28	6.63	5.35	6.54	8.66
Mirebalais	8	1.38	2.05	3.07	2.20	3.74	4.17	2.76	5.12	5.24	4.92	4.59	2.36	5.24
Mole-St.-Nicholas	14	2.80	2.60	1.77	2.09	3.10	1.83	1.64	5.08	2.40	5.39	3.25	1.50	5.39
Port au Prince	41	2.87	1.63	3.52	3.88	4.26	2.89	2.44	4.59	5.78	3.64	6.11	1.56	5.78

MEAN NUMBER OF DAYS WITH PRECIPITATION

Anse a Veau	13	4	3	6	8	12	11	10	10	10	9	6	3	92
Bayeux	14	13	10	9	10	12	10	6	7	12	15	17	14	135
Cap Haitien	14	6	6	5	5	8	5	4	3	6	10	11	7	76
Cayes	16	6	7	9	12	14	11	10	11	12	13	8	5	118
Ganthier	14	2	2	4	6	8	4	3	5	8	9	4	2	57
Gonaives	16	1	1	2	2	6	7	6	6	5	5	1	1	43
Jacmel	14	5	6	10	12	16	11	7	10	12	12	8	4	113
Jeremie	15	5	6	5	7	10	8	7	7	8	8	7	6	84
Mirebalais	8	2	3	6	10	16	15	14	18	17	16	8	4	129
Mole-St.-Nicholas	15	3	3	3	3	5	4	3	4	5	5	5	3	46
Petion Ville	14	3	4	8	11	14	9	7	9	13	12	7	3	100
Port au Prince	41	5	6	10	14	17	10	9	13	15	14	9	5	127
Port de Paix	16	10	7	6	4	7	6	5	7	9	8	11	10	90
St. Marc	11	1	2	2	3	9	12	10	11	10	8	2	2	72
St. Michel	14	1	2	3	5	11	12	7	8	9	9	4	2	73
Tiburon	9	5	4	7	10	6	2	6	9	10	12	7	4	82

The accompanying table for Port au Prince is based in large part on the valuable tabulations contained in several numbers of the bulletin issued by the meteorological observatory of the Seminaire-College, St. Martial, Port au Prince. The volumes for the years 1910, 1911, 1912, 1919, 1920, and 1921 furnish complete records of temperature and precipitation. Monthly records at Port au Prince for the years 1864–1869 and also annual records for the neighboring station of Leogane for the period 1761–1786 were published by Raulin in *Actes de l'Academie nationale des sciences, belles-lettres et arts de Bordeaux*, vol. 36, 1874. The mean for the 26-year period 1761–1786 is 53 inches, which is practically the same as that for the recent period of 44 years (55 inches).

TABLE 25.—*Port au Prince, Haiti*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	20	87.8	88.2	88.9	89.4	89.8	92.1	94.1	93.4	91.4	89.6	87.8	87.4	90.0
Mean minimum	20	68.2	68.5	69.4	70.9	72.5	73.4	73.8	73.4	72.9	72.1	71.2	69.3	71.3
Mean	20	78.0	78.4	79.2	80.2	81.2	82.8	84.0	83.4	82.2	80.8	79.5	78.4	80.7
Highest	25	93	95	98	98	99	99	100	100	99	98	96	93	100
Lowest	25	62	59	63	61	66	64	68	68	67	66	64	60	59
Relative humidity														
Mean, 7 a., 1 p., 9 p.	29	65	63	64	68	73	68	64	68	73	76	72	68	69
Cloudiness														
Mean, 3 observations	28	2.7	3.1	3.9	4.8	5.4	4.8	4.2	4.4	5.1	4.8	3.7	3.1	4.2
Sunshine														
Mean daily duration (hours)	25	8.8	9.0	9.0	8.5	8.1	8.1	8.8	8.7	7.8	7.3	8.2	8.2	8.4
Percentage of possible	25	79	79	75	68	63	62	67	68	64	62	73	74	70
Precipitation														
Mean	44	1.15	2.41	3.73	6.65	9.42	4.17	2.86	5.30	7.52	6.89	3.61	1.31	55.03
Maximum in 24 hours	41	2.87	1.63	3.52	3.88	4.26	2.89	2.44	4.59	5.78	3.64	6.11	1.56	5.78
Days with rain	41	5	6	10	14	17	10	9	13	15	14	9	5	127
Days with thunderstorm	13	1	1	3	5	13	15	16	17	20	15	6	2	114
Wind														
Prevailing direction*														
Mean hourly velocity	12	7.0	7.1	7.2	6.5	6.3	7.4	7.8	7.0	6.2	5.4	5.7	6.1	6.6

* The prevailing winds are from the west in the afternoon and in January–April the westerly direction frequently continues until 9 p. m.; they are from the east, or easterly at all other times.

DOMINICAN REPUBLIC

In the eastern part of the island of Haiti meteorological conditions are approximately the same as in the western Republic.

Miscellaneous data are available only for stations on the coasts: Puerto Plata (19° 49′ N., 70° 43′ W., elevation 40 feet), and Sanchez (19° 13′ N., 69° 37′ W., elevation 50 feet), at the north, and Santo Domingo (18° 28′ N., 69° 53′ W., elevation 60 feet) near the middle of the southern coast. The series of observations at Puerto Plata, for the period 1908–1922 published in the St. Martial (Port au Prince) bulletins is much longer than the later one reported to the Weather Bureau and is chosen to represent that station; the short series for 1910–1914 appearing in the *Annales* of the Meteorological Bureau of France is selected for Santo Domingo.

Near sea level the mean annual temperature is 78°, the means for January–March are about 74° and those for July–October are between 80° and 81.5°. Temperature extremes are approximately 95° and 55°.

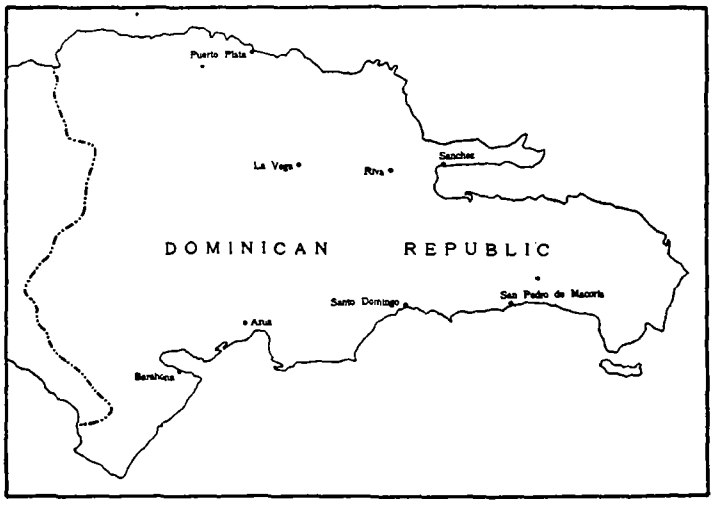


TABLE 26.—*Puerto Plata, Dominican Republic*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	13	78.8	78.8	79.3	80.1	82.2	84.0	84.6	85.3	85.6	85.1	81.5	79.9	82.1
Mean minimum	13	70.2	69.6	70.3	71.4	73.9	76.1	76.8	77.4	76.8	76.1	74.1	71.4	73.7
Mean	13	74.5	74.2	74.8	75.8	78.0	80.0	80.7	81.4	81.2	80.6	77.8	75.6	77.9
Highest	13	87	87	88	89	91	94	91	91	92	91	89	87	94
Lowest	13	59	62	61	64	64	72	72	72	70	70	68	62	59
Cloudiness														
Mean, 7 a., 1 p., 9 p	9	4.0	4.0	3.7	3.9	3.6	3.4	3.4	3.3	3.1	3.1	4.3	4.1	3.7
Precipitation														
Mean	17	7.47	6.47	3.24	5.74	3.66	1.66	3.02	3.02	4.68	3.77	14.40	9.20	66.33
Maximum in 24 hours	13	8.74	9.65	5.51	3.94	3.94	2.24	2.16	4.13	3.31	4.13	10.75	10.83	10.83
Days with rain	13	15	11	12	10	9	6	9	8	7	8	13	16	124
Wind														
Prevailing direction, 8 a., 8 p.*	4	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.

* Weather Bureau series, 1918–1921.

TABLE 27.—*Sanchez, Dominican Republic*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean*	3	73.8	73.6	75.0	76.4	78.0	79.4	79.9	80.4	81.0	79.6	77.8	75.0	77.4
Highest	3	89	90	94	96	94	92	90	93	96	92	92	88	96
Lowest	3	60	60	58	62	64	68	68	70	68	66	64	60	58
Precipitation														
Mean	10	6.04	3.80	3.89	7.15	8.54	8.72	6.72	8.90	6.07	5.11	7.88	5.56	78.38

* Formula (maximum+minimum)÷2. (Series 1886-1888.)

TABLE 28.—*Santo Domingo, Dominican Republic*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	5	84.2	84.6	84.4	85.1	86.2	87.3	88.5	89.2	89.2	89.4	88.2	86.5	86.9
Mean minimum	5	66.2	65.7	66.6	68.4	70.2	71.4	71.6	72.0	71.8	71.1	70.0	68.4	69.4
Mean	5	75.2	75.2	75.5	76.8	78.2	79.4	80.0	80.6	80.5	80.2	79.1	77.4	78.2
Highest	5	89	89	88	89	91	93	94	95	94	93	93	92	95
Lowest	5	57	57	59	64	64	67	68	69	69	68	65	63	57
Relative humidity														
Mean, 6 a., noon, 9 p	5	81	77	78	78	80	81	81	82	82	82	82	82	80
Cloudiness														
Mean, 3 observations	5	4.4	4.4	4.3	4.9	5.0	4.9	4.4	4.5	4.3	4.3	4.3	4.4	4.5
Precipitation														
Mean *	14	2.07	1.20	2.75	3.68	5.06	5.76	7.22	6.67	7.22	7.29	4.25	2.29	55.46
Maximum in 24 hours b	10	1.51	0.65	2.78	6.20	5.00	2.40	4.78	5.41	5.09	7.42	2.53	0.98	6.20
Days with rain b	10	12	8	9	10	12	14	16	16	16	14	12	12	151
Wind														
Prevailing direction c	4													
Mean hourly velocity	2	4.8	5.4	5.5	5.6	5.0	4.7	5.1	5.3	5.0	4.5	5.4	5.8	5.2

* From Weather Bureau records 1898-1906 (broken) and 1919-1924 (broken) combined with those of the *Seminaire-Conciliar*.
b From Weather Bureau data noted above.
c North or northeast in all months: no data relative to daily march.

From the longer records the mean annual precipitation is found to be approximately between 60 and 80 inches for the northern coast region and river valleys; on the eastern half of the southern coast there is a decrease to 45 to 55 inches, and west of this region a further considerable decrease to slightly more than 20 inches. The greatest monthly amounts occur during the period from May to November and the averages exceed 8 inches at the north; the least amounts (excepting the values for Puerto Plata with minimum in June) occur from December to March, and at this time along the southwestern coast the total for the four months averages only 2 inches.

In Table 29 the rainfall stations are arranged from west to east in northern and southern groups.

TABLE 29.—*Mean precipitation (in inches) Dominican Republic*

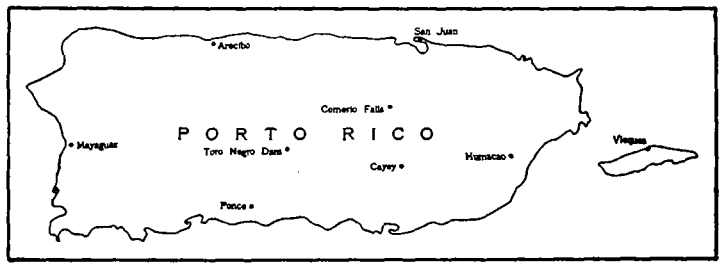
Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Northern group														
Puerto Plata	17	7.47	6.47	3.24	5.74	3.66	1.66	3.02	3.02	4.68	3.77	14.40	9.20	66.33
La Vega	10	5.96	4.21	5.10	5.35	7.03	5.94	7.49	4.80	5.91	6.81	8.44	4.26	71.30
Riva	6	4.64	4.15	2.76	4.09	5.42	9.67	6.88	7.22	6.10	5.81	8.94	4.99	70.67
Sanchez	10	6.04	3.80	3.89	7.15	8.54	8.72	6.72	8.90	6.07	5.11	7.88	5.56	78.38
Southern group														
Barahona	4	0.74	0.36	1.34	1.91	5.11	2.90	1.08	1.10	3.10	4.12	*0.85	0.08	22.69
Azua	6	0.19	0.36	0.79	1.06	3.86	2.11	1.55	2.66	3.58	2.32	2.46	0.09	21.03
Santo Domingo	14	2.07	1.20	2.75	3.68	5.06	5.76	7.22	6.67	7.22	7.29	4.25	2.29	55.46
San Pedro de Macoris	14	2.12	1.65	1.57	1.86	3.70	4.73	3.74	5.82	7.55	4.86	4.24	2.53	44.37

* 20.96 inches reported in 1924, considered doubtful, and not included.

Records for 1915-1917 and 1921-1924 for other stations are found in the Revista de Agricultura (Santo Domingo), February, 1917, and in the annual numbers of Climatological Data, West Indies and Caribbean Service, U. S. Weather Bureau.

PORTO RICO

The tables for this island are taken from the copy now being prepared at the San Juan office of the U. S. Weather Bureau for the issue of a complete climatology of the island. The distribution of stations chosen is as follows: Coast stations at elevations of 100 feet or less—San Juan and Arecibo (north), Vieques Island (off eastern extremity), Humacao (east), Ponce (south), and Mayaguez (west), and the interior stations of Comerio Falls, Cayey, and Toro Negro Dam at elevations of 500, 1,350, and 2,275 feet, respectively.



Temperature.—The mean annual temperature is about 78° for the low stations, 73° at Cayey, and 69° at Toro Negro Dam. The range in monthly mean temperature from August and September to January and February is from 5° to 7°. The observed temperature extremes for stations near sea level are 101° at Arecibo and 51° at Mayaguez and those for the 2,300-foot level are 87° and 46°. At San Juan the extreme range in temperature is from 94° to 62°.

Precipitation.—In common with other mountainous islands of the West Indian region, Porto Rico shows marked changes in the amounts of rain received at stations separated by only a few miles. From north to south along a diagonal cross section 45 miles in length we find the following values (in inches) for mean annual precipitation: San Juan, 61; Comerio Falls, 79; Toro Negro Dam, 93; and Ponce, 35. The total yearly fall at the eastern and western extremities as represented by Humacao and Mayaguez is about 80 inches. As a rule precipitation is greatest in October or November and least in February, the means in these periods ranging from 6 to 15 inches and from 1 to 5 inches respectively. Days with rain show as an annual average values from only 92 at Ponce up to 213 at San Juan. Maximum precipitation in 24 hours runs fairly high, with an extreme of 14.90 inches at Humacao.

Wind.—The table of prevailing wind directions shows a shifting from northeast on the western coast (Mayaguez) to east on the northern and eastern coasts (San Juan and Humacao) and to southeast on the southern coast (Ponce). In the interior north of the divide the winds come from directions northeast to southeast, as, for example, at Cayey, while south of the divide they blow from the south, as at Toro Negro Dam.

TABLE 30.—*Temperature data for Porto Rico.* (°F.)

MEAN MAXIMUM

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
San Juan	25	80.1	80.4	80.6	82.0	84.0	84.9	85.0	85.4	85.9	85.5	83.6	81.4	83.2
Cayey	19	79.6	79.9	81.0	82.7	84.1	84.6	85.6	86.2	86.2	85.6	84.0	81.3	83.4
Toro Negro Dam	9	74.1	74.3	74.6	74.6	76.1	77.9	79.6	81.1	78.8	78.1	77.1	75.5	76.8
Mayaguez	24	85.8	86.2	86.6	87.5	88.4	89.1	89.1	90.1	90.6	89.9	88.3	86.9	88.2

TABLE 30.—*Temperature data for Porto Rico.* (°F.)—Continued

MEAN MINIMUM

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
San Juan	25	69.6	69.4	69.9	71.2	73.1	74.4	74.9	75.3	74.9	74.2	72.8	71.1	72.6
Cayey	19	58.4	58.7	58.9	60.3	63.4	65.0	65.7	66.1	65.5	64.4	62.6	60.3	62.4
Toro Negro Dam	9	58.5	57.5	57.8	58.0	61.5	62.7	62.8	64.3	62.8	62.3	61.3	59.7	60.8
Mayaguez	24	62.6	62.2	62.2	64.1	66.8	67.9	68.3	68.1	68.0	68.1	66.7	64.5	65.8

MEAN

San Juan	25	74.9	75.0	75.2	76.6	78.6	79.7	79.9	80.4	80.4	79.8	78.2	76.2	77.9
Arecibo	21	74.3	74.8	75.3	76.7	78.7	79.8	80.0	80.6	80.6	80.1	78.2	75.9	77.9
Cayey	19	69.0	69.3	70.6	71.5	73.8	74.8	75.7	76.1	75.9	75.0	73.3	70.8	72.9
Comerio Falls	18	82.6	73.0	73.0	74.8	77.8	78.5	78.8	79.0	79.1	78.4	76.7	74.4	76.3
Humacao	18	73.7	74.0	74.8	76.2	78.1	79.2	79.7	80.2	79.7	79.0	77.4	75.0	77.2
Mayaguez	24	74.2	74.2	74.4	75.8	77.6	78.5	78.7	79.1	79.3	79.0	77.5	75.7	77.0
Ponce	19	75.2	75.2	75.9	77.4	79.4	80.5	80.8	81.5	81.1	80.3	78.9	76.8	78.6
Toro Negro Dam	9	66.3	65.9	66.2	66.4	68.9	70.3	71.2	72.7	70.8	70.2	69.2	67.6	68.8
Vieques Island	23	76.4	76.7	77.5	78.4	79.9	80.8	81.4	81.7	81.4	80.7	79.0	77.4	79.3

HIGHEST

San Juan	25	87	90	90	93	94	93	91	91	94	93	91	88	94
Arecibo	23	94	96	96	95	98	99	99	97	101	100	98	98	101
Cayey	19	91	87	91	91	92	93	92	94	92	90	92	88	94
Comerio Falls	18	90	97	98	94	96	97	95	98	96	99	97	94	99
Humacao	18	94	93	96	98	92	97	95	96	96	96	97	95	98
Mayaguez	24	91	93	95	98	97	96	96	97	97	99	98	96	99
Ponce	19	90	90	90	93	95	96	95	96	95	95	94	91	96
Toro Negro Dam	9	83	81	82	82	82	85	86	86	86	86	87	85	87
Vieques Island	23	92	93	94	91	94	95	94	98	98	99	97	95	99

LOWEST

San Juan	25	63	62	63	65	66	66	70	68	69	68	66	62	62
Arecibo	23	52	52	52	55	54	58	60	61	60	58	58	55	52
Cayey	23	44	44	46	49	50	51	58	58	58	56	52	48	44
Comerio Falls	18	50	50	53	55	61	63	62	66	61	61	59	56	50
Humacao	18	54	53	53	52	58	55	66	65	65	60	60	54	52
Mayaguez	24	51	52	55	57	57	59	60	58	60	61	58	55	51
Ponce	19	57	55	58	59	61	58	58	64	68	61	60	57	55
Toro Negro Dam	9	46	51	48	50	54	56	56	57	56	53	53	51	46
Vieques Island	23	61	62	64	63	65	64	67	68	68	66	64	62	61

TABLE 31.—*Precipitation data for Porto Rico*

MEAN PRECIPITATION (IN INCHES)

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
San Juan	25	4.15	2.71	2.98	4.10	5.28	5.31	5.68	5.99	6.20	5.58	6.86	5.80	60.64
Arecibo	21	5.72	3.91	4.06	4.46	5.92	3.48	5.07	4.47	4.73	4.95	8.89	5.86	61.52
Cayey	25	3.30	2.90	3.00	3.61	4.53	6.14	6.38	6.34	6.27	6.59	6.13	4.41	59.60
Comerio Falls	17	6.95	4.56	5.14	5.73	6.41	4.88	7.52	7.88	7.41	6.54	8.71	7.58	79.31
Humacao	25	4.20	3.32	3.86	4.60	8.74	8.93	8.27	8.48	10.28	9.69	8.45	5.25	84.07
Mayaguez	25	1.87	2.27	3.36	5.51	7.87	8.74	11.05	11.47	10.52	9.44	6.09	2.81	81.00
Ponce	23	1.03	0.97	1.42	2.14	2.91	3.85	2.89	4.19	4.92	6.72	3.47	1.36	35.83
Toro Negro Dam	13	3.97	4.79	4.01	7.96	8.68	6.53	7.18	6.70	12.78	15.22	9.88	4.95	92.65
Vieques Island	25	3.04	2.53	2.28	2.75	3.73	4.44	4.33	4.48	6.24	6.33	5.30	3.67	49.12

MAXIMUM PRECIPITATION IN 24 HOURS (IN INCHES)

San Juan	25	3.07	4.84	2.83	6.72	4.81	5.26	4.05	6.26	6.40	3.35	5.52	10.55	10.55
Arecibo	21	4.20	4.10	5.05	6.50	4.00	2.70	2.30	2.45	2.90	2.60	8.00	4.00	8.00
Cayey	25	1.60	2.20	3.00	4.30	4.00	6.83	4.52	9.00	6.47	7.00	7.65	4.65	9.00
Comerio Falls	17	4.50	3.10	2.55	3.71	3.76	3.22	3.65	5.71	10.00	2.40	5.00	6.80	10.00
Humacao	25	2.20	2.77	3.76	6.60	9.84	5.38	5.50	6.16	14.90	5.74	10.42	3.92	14.90
Mayaguez	25	1.77	2.43	2.69	4.07	4.06	4.05	3.60	8.40	9.50	7.18	4.08	3.00	9.50
Ponce	23	1.52	0.87	1.90	1.80	2.20	3.11	2.45	4.05	4.45	7.68	5.01	2.20	7.68
Toro Negro Dam	13	2.60	3.14	2.60	7.56	3.60	4.07	6.10	6.00	5.10	8.00	6.10	3.82	8.00
Vieques Island	25	1.54	3.92	1.88	8.00	4.10	4.00	6.00	8.05	10.00	3.99	6.26	3.98	10.00

MEAN NUMBER OF DAYS WITH PRECIPITATION

San Juan	25	20	15	17	14	16	17	20	19	18	17	19	21	213
Arecibo	21	13	9	9	9	11	9	12	11	11	13	14	13	134
Cayey	25	16	12	13	10	11	13	14	14	13	15	16	17	164
Comerio Falls	17	19	15	16	14	15	15	19	18	18	18	18	20	205
Humacao	25	15	12	14	12	18	19	19	19	18	18	17	15	196
Mayaguez	25	8	8	9	13	15	15	18	19	18	17	13	10	163
Ponce	23	6	4	6	7	9	7	7	9	10	13	8	6	92
Toro Negro Dam	13	12	11	11	12	16	13	15	15	18	21	18	13	175
Vieques Island	25	14	12	12	9	12	14	15	15	14	14	15	15	161

TABLE 32.—*Prevailing wind directions, Porto Rico*

Stations	Length of record, year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
San Juan [a]	25	e.	e.	e.	e.	e.	e.	e.	e.	e.,se	e.	e.	e.	e.
Cayey [b]	8	ne.	e.	ne.	e.	e.	e.	e.	e.	e.	se.	se.	e.	e.
Humacao	5	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.
Mayaguez	22	ne.	ne.	ne.	ne.	ne.	se.	n.	ne.	ne.	se.	ne.	ne.	ne.
Ponce	16	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.	se.
Toro Negro Dam	13	n.	s.	s.	s.	s.	s.	s.	s.	s.	s.	n.	s.	s.
Vieques Island	23	e.	e.	e.	e.	s.	e.	e.	e.	s.	s.	e.	e.	e.

[a] Automatic record for 24 hours.
[b] From eye observations during daylight hours at Cayey and remaining stations.

Miscellaneous meteorological data for San Juan (18° 29′ N., 66° 7′ W., elevation 100 feet) appear in the following table:

TABLE 33.—*San Juan, Porto Rico*

	Length of record years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	25	80.1	80.4	80.6	82.0	84.0	84.9	85.0	85.4	85.9	85.5	83.6	81.4	83.2
Mean minimum	25	69.6	69.4	69.9	71.2	73.1	74.4	74.9	75.3	74.9	74.2	72.8	71.1	72.6
Mean	25	74.9	75.0	75.2	76.6	78.6	79.7	79.9	80.4	80.4	79.8	78.2	76.2	77.9
Highest	25	87	90	90	93	94	93	91	91	94	93	91	88	94
Lowest	25	63	62	63	65	66	66	70	68	69	68	66	62	62
Relative humidity														
Mean, 9 a., 9 p.	11	79	78	76	76	77	79	78	79	80	81	81	80	
Mean, noon	6	74	75	73	75	74	76	78	76	76	76	75	76	79
Cloudiness														75
Mean, daylight hours	25	4.5	4.2	4.1	4.6	5.3	5.4	5.5	4.6	5.3	5.0	4.8	4.7	4.8
Sunshine														
Mean daily duration (hours)	25	6.9	7.8	8.2	7.8	7.6	7.7	8.1	8.4	7.4	7.3	6.9	6.8	7.6
Precipitation														
Mean	25	4.15	2.71	2.98	4.10	5.28	5.31	5.68	5.99	6.20	5.58	6.86	5.80	60.64
Maximum in 24 hours	25	3.07	4.84	2.83	6.72	4.81	5.26	4.05	6.26	6.40	3.35	5.52	10.55	10.55
Days with rain	25	20	15	17	14	16	17	20	19	18	17	19	21	213
Days with thunderstorm	25	(a)	(a)	(a)	1	5	7	7	7	10	8	3	1	49
Wind														
Prevailing direction	25	e.	e.	e.	e.	e.	e.	e.	e.	e, se.	e.	e.	e.	e.
Mean hourly velocity:														
Station I [b]	13	11.2	11.0	11.3	11.2	10.7	12.1	12.5	11.7	9.4	7.8	8.8	10.1	10.6
Station II [c]	11	14.7	13.2	15.1	13.3	12.3	12.2	14.7	14.0	10.0	8.6	10.4	12.7	12.6
Maximum velocity	25	54	48	48	44	39	50	52	*92	72	52	50	48	92
Direction at maximum velocity		ne.	nw.	e.	e.	ne.	se.	ne.	ne.	ne.	n.	ne.	e.	ne.
Days with gales [d]	18	0.7	0.2	0.1	0.2	0.0	0.1	0.3	0.6	0.3	0.2	0.4	0.1	3.2
Days with fog [d]	18	0	0	0	0	0	0	0	0	0	0	0	0	0

*Aug. 22, 1916.
[a] For the period of 25 years the totals for January, February, and March are 4, 4, and 7, respectively.
[b] In San Juan proper; elevation, 90 feet; winds modified by higher land and buildings.
[c] In Puerta de Terra; elevation, 54 feet; open exposure.
[d] The West Indies Pilot, Vol. II, seventh edition (1920).

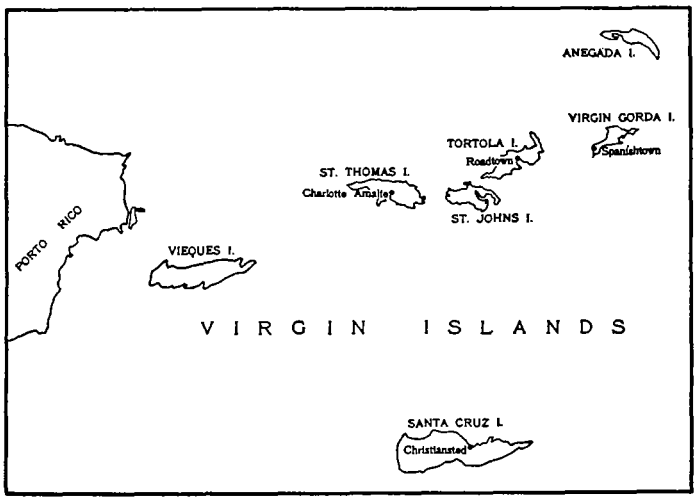
VIRGIN ISLANDS

The series of meteorological observations at Charlotte Amalie, St. Thomas (18° 13′ N., 64° 29′ W., elevation 27 feet), and Christiansted, St. Croix (17° 45′ N., 62° 42′ W., elevation 82 feet) furnish rather complete data on conditions in this region.

The table for Charlotte Amalie is based largely on recent observations by the Weather Bureau; that for Christiansted on data published in yearbooks of the Danish Service.

The mean annual temperature is 79.5°, with monthly means from about 82.5° in August to 77° in January and February. The temperature extremes for the period of 33 years shown by the Christiansted record are 96° and

64°. Relative humidity increases from 72 per cent in March and April to 78 per cent in October and November; cloudiness, however, reaches an earlier maximum of 4.4 in June.



The average amount of rain received annually is from 40 to 50 inches. Local monthly means fall below 2 inches near the first of the year; beginning with May, there is a rather uniform increase in precipitation which reaches the maximum in October or November, when it is about 6 to 7 inches.

TABLE 34.—*Charlotte Amalie, St. Thomas*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	7	82.3	82.3	82.3	83.0	84.7	86.0	87.0	87.9	87.8	87.2	86.1	83.4	85.0
Mean minimum	7	71.8	72.0	72.0	73.5	75.7	77.0	77.2	77.9	76.8	76.3	75.2	73.0	74.9
Mean	7	77.0	77.2	77.2	78.2	80.2	81.5	82.1	82.9	82.3	81.8	80.6	78.2	79.9
Highest	7	88	88	87	89	88	90	90	92	92	92	91	89	92
Lowest	7	66	63	67	68	71	71	70	70	72	71	70	66	67
Precipitation														
Mean	17	2.71	1.87	2.41	1.89	2.66	3.19	3.09	3.38	5.44	6.15	4.99	3.16	40.89
Maximum in 24 hours	7	1.40	1.60	2.16	1.90	2.40	1.26	2.75	4.65	2.90	5.30	2.65	1.58	5.30
Days with rain	7	18	15	16	13	13	18	18	19	17	19	19	20	205

TABLE 35.—*Christiansted, St. Croix*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	17	80.8	80.8	81.7	82.8	84.9	85.6	85.8	86.2	86.5	85.8	84.2	82.0	83.9
Mean minimum	17	72.3	71.8	72.1	73.6	75.6	76.6	77.0	77.5	77.0	76.3	75.2	73.6	74.9
Mean	17	76.6	76.3	76.9	78.2	80.2	81.1	81.4	81.8	81.8	81.0	79.7	77.8	79.3
Highest	33	86	87	91	91	95	96	94	91	91	91	92	91	96
Lowest	33	65	66	64	67	69	69	70	70	69	69	69	65	64
Relative humidity														
Mean, 8 a., 2 p., 9 p.	17	74	73	72	72	74	76	74	75	77	78	78	77	75
Mean, 2 p.	4	68	70	65	68	72	69	69	69	70	72	75	72	70
Cloudiness														
Mean, 3 observations	19	3.7	3.5	3.5	3.7	4.0	4.4	4.3	3.9	4.0	3.9	3.7	3.7	3.9
Precipitation														
Mean	37	2.32	0.05	1.24	2.97	4.39	4.53	3.46	4.26	5.59	5.88	5.89	3.87	46.43
Days with rain	37	13	10	7	8	11	11	12	12	12	13	14	13	136
Days with thunderstorm	19	(a)	(a)	(a)	(a)	2	2	2	3	2	3	1	1	16
Wind														
Prevailing direction, 3 observations	4	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.

a For period of 19 years the totals for the months January–March are 4, 1, 1, and 8, respectively.

TABLE 36.—*Mean precipitation (in inches), Virgin Islands*

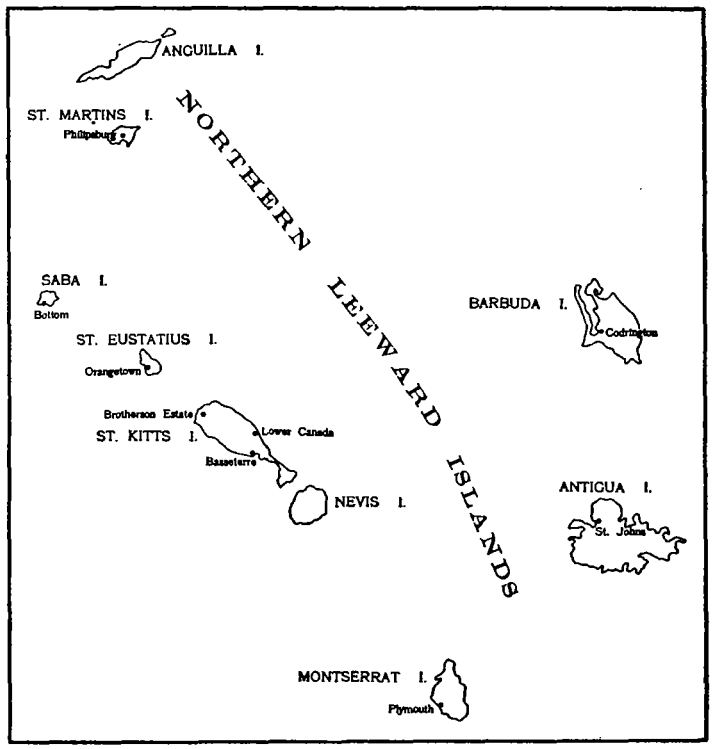
Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Charlotte Amalie	17	2.71	1.87	2.41	1.89	2.66	3.19	3.09	3.38	5.44	6.15	4.99	3.16	40.89
Christiansted	37	2.30	2.05	1.24	2.97	4.39	4.53	3.46	4.26	5.59	5.88	5.89	3.87	46.43
Tortola [a]	24	3.10	2.92	2.23	2.50	4.24	4.25	4.20	4.15	4.93	7.15	7.02	4.76	51.45
Virgin Gorda [b]	12	2.10	2.40	1.28	1.59	3.12	3.15	2.09	3.23	3.64	4.51	5.69	3.53	36.33

a Botanic station at Roadtown. Means from Report on the Agricultural Department, Tortola, Virgin Islands, 1919–20, revised to include 1924.
b Spanishtown.

NORTHERN LEEWARD ISLANDS [1]

In this group lying north of Guadeloupe are situated four stations with rather complete data: Orangetown, St. Eustatius (17° 29′ N., 62° 59′ W.); Basseterre, St. Kitts (17° 20′ N., 62° 44′ W., elevation 29 feet); St. Johns, Antigua (17° 10′ N., 61° 51′ W., elevations 25 to 80 feet); and Plymouth, Montserrat (16° 41′ N., 62° 9′ W., elevation 130 feet).

Interesting papers on the climate of this region are found in the MONTHLY WEATHER REVIEW as follows: St. Kitts, Annual Summary, 1899 and November, 1900; Antigua, April, 1901.



The data for Orangetown given here are from the *Encyclopaedia van Nederlandsch West-Indie*, p. 411; those for Basseterre are compiled from more detailed records following the period used in the papers mentioned above, and those for St. Johns are copied almost entirely from the MONTHLY WEATHER REVIEW of April, 1901.

The mean annual temperature for the region is from 77° to 80°. The lower mean at Orangetown is due to comparatively low maximum temperatures—mean maximum 81° as against 86° at St. Johns; highest observed maximum only 88°. Relative humidity gradually increases from March to November, with a range of 8 per cent.

1 This designation conveniently includes in one division the small islands belonging to Great Britain and Holland.

East winds prevail throughout the year; the maximum hourly velocity is slightly above 10 miles (July) and the minimum 5 to 7 (October).

Over the greater part of this region the mean amount of rainfall received annually is from 40 to 50 inches, but at Plymouth, Montserrat, and stations in the northern part of St. Kitts there is an increase to 70 inches and over (Brotherson, 85 inches). The annual march of precipitation is practically the same as in regions previously considered—maximum in September–November, minimum in February–March.

TABLE 37.—*Orangetown, St. Eustatius*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	5	77.2	77.5	78.1	79.2	80.8	82.0	82.4	83.5	82.9	82.4	81.5	79.5	80.6
Mean minimum	5	71.1	70.9	71.1	72.5	73.2	75.2	75.6	76.1	75.9	75.2	74.7	73.0	73.7
Mean	5	74.2	74.2	74.6	75.8	77.0	78.6	79.0	79.8	79.4	78.8	78.1	76.2	77.1
Highest	5	83	86	83	83	88	86	86	88	88	88	86	86	88
Lowest	5	67	64	66	68	66	70	72	72	71	69	70	69	64
Cloudiness														
Mean	5	3.2	3.6	2.7	3.1	3.6	3.6	3.2	3.3	3.1	3.0	2.9	3.1	3.2
Precipitation														
Mean	44	2.58	1.97	1.81	2.11	3.50	3.56	4.01	4.57	4.95	5.15	4.88	3.45	42.54

TABLE 38.—*Basseterre, St. Kitts*

	Length of records, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	13	81.5	81.3	81.4	82.6	84.0	85.1	85.7	86.4	86.4	86.1	85.0	82.7	84.0
Mean minimum	13	71.4	71.2	71.1	72.8	74.6	75.5	75.9	76.3	75.9	75.1	74.1	72.3	73.8
Mean	13	76.4	76.2	76.2	77.7	79.3	80.3	80.8	81.4	81.1	80.6	79.6	77.5	78.9
Highest	13	86	85	88	87	87	88	88	89	92	90	90	88	92
Lowest	13	64	66	64	67	67	68	68	67	67	68	64	64	64
Relative humidity														
Mean, 8 a., 8 p	4	76	74	70	74	76	77	76	77	78	78	78	75	76
Cloudiness														
Mean, 2 observations	4	4.8	4.4	4.4	4.8	5.6	6.1	5.3	5.0	5.2	5.0	4.8	4.3	5.0
Precipitation														
Mean	56	3.48	1.95	2.11	3.18	3.90	4.02	4.34	5.37	6.38	6.11	5.22	3.67	49.73
Maximum in 24 hours	13	2.80	1.98	1.45	2.50	3.10	4.60	2.21	10.60	5.50	4.80	6.69	2.25	10.60
Days with rain	21	17	14	13	12	14	17	18	18	18	18	16	18	193
Days with thunderstorm	4	0	0	0	(a)	3	3	2	1	4	4	2	1	20
Wind														
Prevailing direction	4	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.
Mean hourly velocity	4	10.0	9.7	10.3	9.7	9.0	10.4	11.1	10.7	9.3	6.9	8.3	8.7	9.5
Maximum velocity	4	27	34	24	32	27	34	42	*72	62	42	34	29	72
Direction at maximum	----	e.	e.	e.	s.	sw.	s.	se.	ne.	sw.	sw.	sw.	se.	ne.

[a] Aug. 7, 1899.

[b] Total for period of 4 years, 1.

TABLE 39.—*St. Johns, Antigua*

	Length of records, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	11	83.7	83.4	84.0	85.0	85.9	86.9	87.2	88.1	88.2	87.7	85.9	85.0	85.9
Mean minimum	11	70.2	70.1	70.5	72.0	73.7	75.2	75.4	75.9	74.8	74.2	73.0	71.5	73.0
Mean	11	76.9	76.8	77.2	78.4	79.8	81.1	81.3	82.0	81.5	80.6	79.4	78.2	79.5
Highest	11	88	89	90	92	90	91	92	92	93	93	92	90	93
Lowest	11	61	60	60	60	66	69	69	70	69	67	65	63	60
Relative humidity														
Mean, 9 a., 3 p	11	69	66	64	67	70	70	71	70	72	72	73	71	70
Precipitation														
Mean	50	3.25	2.24	2.24	3.20	4.26	3.97	4.65	4.71	5.68	5.74	5.54	3.90	49.38
Days with rain	11	23	18	16	14	17	20	24	22	21	22	23	22	242
Days with thunderstorm	11	(a)	(a)	(a)	(a)	1	2	3	2	3	3	1	(a)	15
Wind														
Prevailing direction	11	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.
Mean hourly velocity	11	8.1	8.6	8.7	8.6	8.7	9.9	10.2	9.0	6.6	5.0	6.4	5.7	8.0
Days with gales	26	0	0	0	0	0	0	0	(b)	(b)	0	0	0	0.1
Days with fog	26	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Totals for the 10-year period are: January, 2; February, 0; March, 2; April, 2; and December, 2.

[b] Totals for 26-year period are: August, 1; September, 1.

TABLE 40.—*Plymouth, Montserrat*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	4	82.0	83.0	85.0	87.0	88.0	89.0	88.0	89.0	89.0	88.0	86.0	84.0	87.0
Mean minimum	4	70.0	69.0	70.0	72.0	74.0	75.0	75.0	75.0	74.0	73.0	72.0	71.0	73.0
Mean	4	76.0	76.0	78.0	79.0	81.0	82.0	82.0	82.0	81.0	81.0	79.0	77.0	80.0
Highest	4	89	91	93	93	93	94	94	96	97	92	92	89	97
Lowest	4	62	63	64	63	68	71	70	70	68	67	67	64	62
Relative humidity														
Mean, 9 a., 3 p	4	69	68	64	63	66	66	68	68	69	71	72	70	68
Cloudiness														
Mean, 2 observations	4	6.0	6.0	5.0	6.0	6.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0
Precipitation														
Mean	4	4.62	3.99	2.99	3.85	4.45	4.95	6.62	7.34	8.14	9.44	6.75	5.85	68.99
Maximum in 24 hours	4	1.08	1.00	1.08	1.33	1.75	1.56	1.41	3.96	5.50	7.59	2.51	1.28	7.59
Days with rain	4	19	23	17	16	20	20	23	23	21	23	22	22	249
Wind														
Prevailing direction	4	ne.	e.	se.	e.	se.	se.	se.	se.	se.	se.	se.	e.	se.
Mean hourly velocity	2	9.8	11.0	11.1	6.9	8.4	9.2	12.2	9.1	6.2	6.0	7.0	8.8	8.8
Days with fog	4	0.0	0.5	0.3	0.0	0.7	0.3	0.3	0.3	0.0	0.0	0.5	0.0	2.9

TABLE 41.—*Mean precipitation (in inches), Northern Leeward Islands*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
St. Martin														
Philipsburg *	31	2.44	1.69	1.30	2.32	4.06	2.95	3.03	4.45	5.83	4.80	5.39	3.23	41.49
Saba														
Bottom *	25	3.41	2.76	2.04	2.06	3.68	3.00	3.42	3.62	4.79	5.96	5.75	4.09	44.58
Barbuda														
Codrington	14	2.42	1.46	2.06	2.43	2.83	2.00	3.55	2.75	4.19	6.17	6.28	4.74	40.88
St. Eustatius														
Orangetown *	44	2.58	1.97	1.81	2.11	3.50	3.56	4.01	4.57	4.95	5.15	4.88	3.45	42.54
St. Kitts														
Basseterre	56	3.48	1.95	2.11	3.18	3.90	4.02	4.34	5.37	6.38	6.11	5.22	3.67	47.93
Brotherson	5	4.33	2.69	2.58	4.28	7.42	7.26	8.30	7.86	10.48	7.94	13.52	5.76	85.21
Lower Canada	18	2.47	1.57	1.66	2.56	4.31	3.78	3.94	5.76	5.96	4.91	5.05	3.04	45.01
Antigua														
St. John	50	3.25	2.24	2.24	3.20	4.26	3.97	4.65	4.71	5.68	5.74	5.54	3.90	49.38
Montserrat														
Plymouth	4	4.62	3.90	2.99	3.85	4.45	4.95	6.62	7.34	8.14	9.44	6.75	5.85	68.99

* Climatological Data, West Indies and Caribbean Service. July, 1925.

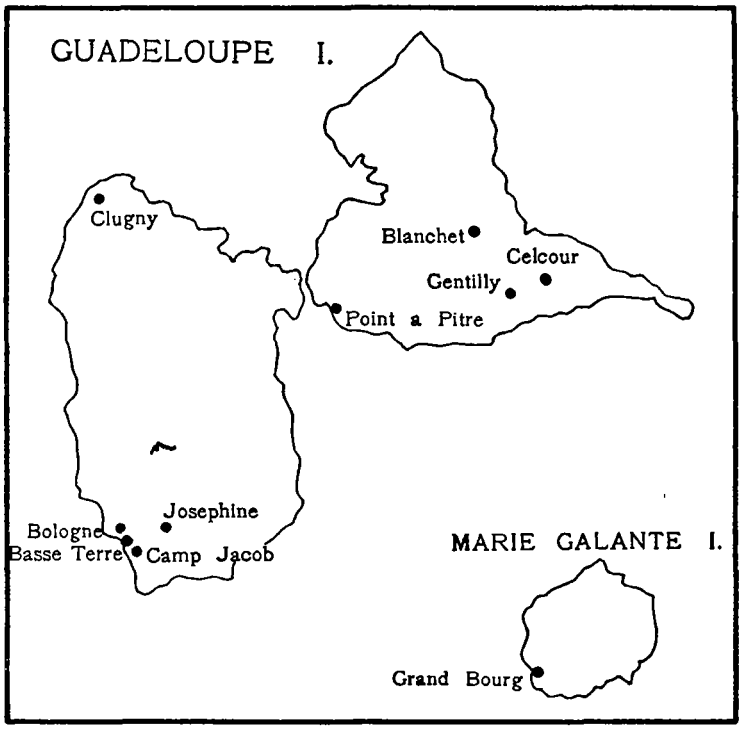
GUADELOUPE

The climatic tables given here are taken from papers appearing in the *Annales* of the French Meteorological Service, 1885, Part IV and 1901, Part I. These cover the period 1879–1884 for Point a Pitre (16° 14′ N., 61° 31′ W., elevation 15 feet) and the period 1891–1900 for Camp Jacob (16° 1′ N., 61° 42′ W., elevation 1,750 feet), and give rainfall data for other stations. Later issues of this publication contain records for Camp Jacob, but on account of change of location and elevation the resulting somewhat broken series has not been combined with the former.

Temperatures at Point a Pitre are practically the same as at Basseterre and St. Johns, in the northern Leeward Islands. At the rather elevated station of Camp Jacob, near the southern end of the island, the mean annual temperature is 72°, or 7° below that for sea level. The extremes for mean monthly temperature are 75° in August and 69° in February. During the 10-year period the highest temperature was only 87° and readings of 60° or lower were recorded in all months except September.

Relative humidity presents the usual annual curve, with minimum about March and maximum in October and November; cloudiness shows the maximum from June to August.

In the western part of the island, Basse Terre, precipitation shows the following range in annual amount: Forty-nine inches at Bologne, on the southwest coast near Basse Terre; 81 inches at Clugny, on the northern coast; 121 inches at Josephine, and 156 inches at Camp Jacob, in the southern interior, the last two places being at elevations of 1,970 and 1,750 feet, respectively. In the eastern part of the island, Grande Terre, the



amount of rain received in the year is generally from 50 to 70 inches, but at Gentilly, near the southern coast, there is the marked rise to 145 inches. In contrast to the island regions immediately to the north the annual march presents the maximum somewhat earlier—July to September—but rainfall continues heavy until November.

TABLE 42.—*Point a Pitre, Guadeloupe*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	6	80.4	80.8	82.0	83.8	85.6	86.5	86.9	86.7	86.5	85.6	83.3	81.1	84.1
Mean minimum	6	69.1	68.4	69.4	72.1	75.4	76.8	76.5	76.1	75.7	74.3	73.2	69.6	73.0
Mean	6	74.8	74.6	75.7	78.0	80.5	81.6	81.7	81.4	81.1	80.0	78.2	75.4	78.6
Highest	6	85	85	87	88	89	90	90	90	90	90	87	85	90
Lowest	6	61	62	63	66	71	72	72	72	64	64	66	63	61
Relative humidity														
Mean, 8 a., 4 p.	3	82	81	79	78	80	80	81	81	82	83	84	83	81
Precipitation														
Mean	19	5.20	3.27	3.99	3.82	6.97	9.37	10.28	10.39	10.24	10.08	9.84	8.35	91.80
Days with rain*	4	17	13	9	11	15	16	16	18	15	20	15	15	180

* 0.04 inch (1 mm.) or more.

TABLE 43.—*Camp Jacob, Guadeloupe*

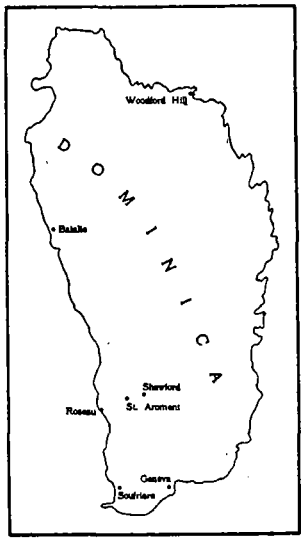
	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	10	75.2	74.8	75.9	78.4	79.3	79.2	79.7	80.8	80.8	79.9	77.9	75.9	78.2
Mean minimum	10	63.7	62.8	63.0	64.9	67.3	68.4	68.4	68.9	68.4	67.8	66.4	64.9	66.2
Mean	10	69.4	68.8	69.4	71.6	73.3	73.8	74.0	74.8	74.6	73.8	72.2	70.4	72.2
Highest	10	80	80	83	85	87	85	84	86	86	85	85	81	87
Lowest	10	56	56	56	58	60	60	58	57	63	59	60	58	56
Relative humidity														
Mean, reduced to 24 hours [a]	10	81	80	80	80	83	81	82	82	83	84	84	82	82
Cloudiness														
Mean, 5 observations	10	5.2	5.2	5.2	5.2	6.1	6.1	6.1	5.7	5.8	5.5	5.4	5.2	5.6
Precipitation														
Mean	10	9.49	6.73	7.48	7.99	15.39	14.17	20.20	16.73	17.09	14.61	16.50	9.84	156.22
Days with rain	10	24	20	21	20	27	26	29	28	24	25	23	23	290
Days with thunderstorm	5	[b]	0	0	[b]	2	3	6	6	7	6	3	[b]	34
Wind														
Prevailing direction	3	ne.	ne.	ne.	ne.	ne.	ne.	e.	ne.	ne.	e.	ne.	e.	ne.
Days with gales	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.4
Days with fog	12	0.2	0.1	0.0	0.1	0.2	0.1	0.1	0.8	0.2	0.2	0.1	0.0	2.1

[a] These means are approximately the same as those obtained as the mean of readings at 9 a. m. and 9 p. m.
[b] Five-year totals for January and April and 6-year total for December are 1, 1, and 3, respectively.

TABLE 44.—*Mean precipitation (in inches), Guadeloupe*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Basse Terre														
Basse Terre [a]	34	5.98	3.82	[e] 2.96	3.87	5.49	6.56	7.46	8.49	7.66	7.98	6.51	6.41	73.19
Bologne	7	2.24	2.17	2.63	1.67	2.72	6.09	5.39	6.86	6.83	4.88	5.03	2.55	49.06
Camp Jacob [b]	11	10.31	6.84	6.77	5.87	10.65	14.71	14.63	15.80	13.80	15.67	13.79	11.98	140.82
Camp Jacob [c]	10	9.49	6.73	7.48	7.99	15.39	14.17	20.20	16.73	17.09	14.61	16.50	9.84	156.22
Clugny	6													80.67
Josephine	6	8.39	8.84	7.36	6.25	8.18	10.80	14.88	13.91	12.76	10.84	11.35	7.31	120.87
Grand Terre														
Blanchet	14	5.35	2.70	3.10	3.77	4.36	5.06	5.48	6.78	6.29	6.62	6.47	4.56	60.54
Celcour	19	4.07	2.56	2.96	3.03	4.22	4.62	5.43	6.37	6.27	6.42	6.20	4.57	56.72
Gentilly	6													145.37
Point a Pitre [d]	16	3.79	3.09	2.43	2.54	6.51	5.98	5.70	5.70	6.19	7.49	6.92	4.93	61.27
Point a Pitre [e]	19	5.20	3.27	3.99	3.82	6.97	9.37	10.28	10.39	10.24	10.08	9.84	8.35	91.80
Marie Galante														
Grand Bourg	23	3.04	2.16	1.75	3.24	4.90	5.63	5.71	6.68	7.31	5.95	6.67	4.58	57.62

[a] Broken series, 1827–1870. Monthly record given by Raulin in *Actes de L'Académie nationale des sciences, belles-lettres et arts de Bordeaux, Volume 36. 1874.*
[b] Broken series, 1855–1870. (Raulin.)
[c] 1891–1900. *Annales du Bureau Central Météorologique de France, Memoires. 1901.*
[d] Broken series, 1849–1870. (Raulin.)
[e] Later series. Climatological Data: West Indies and Caribbean Service, July, 1925.



DOMINICA

The Weather Bureau records for the period 1917–1924 have been taken in determining temperature means at Roseau. The Quarterly Journal of the Royal Meteorological Society (London) for October, 1897, and January, 1903, gives valuable information on precipitation for several stations well distributed over the island. These two papers contain practically all of the rainfall data available.

The table for Roseau (15° 17′ N., 61° 23′ W., elevation 25 feet) shows mean annual temperature (80°) somewhat higher than that found for the preceding groups and also temperature maxima above 90° in all months of the year. Relative humidity and cloudiness have the normal march for this region. The prevailing winds are from northeast or east; the mean hourly velocity is about 5 miles per hour, with a very slight increase in March and April.

The rainfall normals for the stations in Dominica furnish a most interesting example of the effect of exposure. On the leeward coast the mean annual precipitation ranges from about 70 inches in the "drier," middle region to 100 inches at Soufriere, near the southern extremity of the island. At Woodford Hill, on the northeastern, and Geneva, on the southern coast, the amounts are 103 and 123 inches, respectively. The outstanding feature of distribution is the remarkable increase in annual precipitation from 78 inches at Roseau to 105 inches at St. Aroment (elevation 360 feet), about 2 miles to the northeast, and to 185 inches at Shawford (elevation 560 feet), only 1 mile farther in the same direction.

The annual march presents the chief maximum in July or August and a secondary with nearly the same values in November; the chief minimum occurs in March or April.

TABLE 45.—*Roseau, Dominica*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	6	85.8	85.3	85.7	87.1	88.4	88.9	88.4	89.6	90.7	90.3	90.1	86.8	88.1
Mean minimum	6	69.4	69.2	69.5	70.4	72.6	73.8	73.9	73.6	73.7	72.9	72.2	70.4	71.8
Mean	6	77.6	77.2	77.6	78.8	80.5	81.4	81.2	81.6	82.2	81.6	81.2	78.6	80.0
Highest	6	91	91	94	93	93	93	93	96	96	97	96	93	97
Lowest	6	64	63	65	67	69	66	68	71	68	68	69	66	63
Relative humidity														
Mean, 8 a., 8 p.[a]	3	72	68	67	66	68	73	73	74	75	74	75	72	72
Cloudiness														
Mean, 2 observations [a]	3	4.7	3.8	4.1	4.0	4.8	6.5	5.6	5.2	5.4	5.0	4.9	4.5	4.9
Precipitation														
Mean [b]	27	4.92	3.43	3.08	2.97	4.44	8.10	10.75	10.04	8.75	7.73	6.97	6.46	77.64
Mean [c]	14	4.59	2.69	2.37	1.67	3.38	5.75	10.47	8.26	6.03	6.39	5.18	5.09	61.84
Days with rain	10	18	14	15	10	15	21	23	22	19	18	16	18	209
Days with thunderstorm [a]	3	0	0	0	0	1	4	3	4	3	2	2	1	20
Wind														
Prevailing direction [a]	3	ne.	ne.	e.	e.	e.	ne.	ne.	ne.	e.	ne.	ne.	ne	ne.
Mean hourly velocity [a]	3	5.1	5.6	6.5	6.1	5.4	5.0	5.1	5.3	5.2	5.0	4.9	5.2	5.4
Days with fog	4	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] For the period 1899–1901.
[b] From Climatological Data, West Indies and Caribbean Service, July, 1925.
[c] For the period 1893–1924 (broken).

TABLE 46.—*Mean precipitation (in inches), Dominica*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Batalie	5	2.08	1.75	2.40	1.09	7.80	8.20	9.43	7.38	8.35	7.21	8.31	5.92	69.92
Geneva	14													122.64
Roseau	27	4.92	3.43	3.08	2.97	4.44	8.10	10.75	10.04	8.75	7.73	6.97	6.46	77.64
St. Aroment	20	8.74	4.58	4.13	3.80	6.03	12.17	14.40	12.24	10.90	9.90	10.79	7.35	105.03
Shawford [a]	5	11.74	9.09	11.14	9.65	19.22	16.21	23.08	20.51	18.12	14.35	22.79	17.38	193.28
Soufriere	11													100.90
Woodford Hill	16	7.58	4.40	3.08	6.19	9.40	10.14	9.63	9.86	9.80	11.53	10.98	9.36	103.44

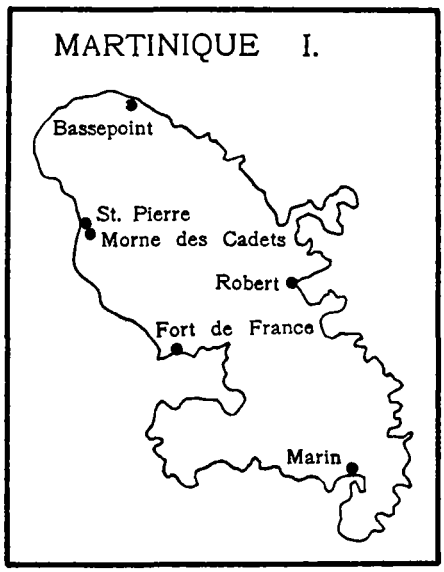
[a] Annual mean for the period 1875–1897, 184.57 inches.

MARTINIQUE

The *Annales* published by the French Meteorological Service contain rather long series of observations at Fort de France near the middle of the western coast (14° 36′ N., 61° 2′ W., elevation 13 feet) and the elevated station of Morne des Cadets (14° 44′ N., 61° 9′ W., elevation 1,676 feet).

The mean annual temperatures for these stations are 79° and 74°, respectively. Monthly mean temperatures range from 80° in June–October to 76° in January–February at the former and from 76° in August–October to 71° in January–February at the latter. Observed temperature extremes are about the same for both locations—90° or slightly higher and about 60°.

In the Climatological Report for the West Ind es are found precipitation data for the years 1921–1923. A series so short will not be of much value in determining normals, but will probably be of some interest relative to



rainfall distribution over the island. Means from this source are given for Bassepoint (north), Robert (middle east coast), and Marin (south). The means for Fort de France for the same period present marked contrast with those for 24 years—56 inches in 1921–1923 and 80 inches in 1891–1914.

TABLE 47.—*Fort de France, Martinique*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	15	83.5	83.8	84.9	86.4	86.7	86.2	86.2	87.1	87.6	87.3	86.4	84.4	85.9
Mean minimum	15	68.9	68.7	69.3	71.2	73.0	73.9	73.9	73.9	73.6	73.0	72.3	70.5	71.8
Mean	15	76.2	76.2	77.1	78.8	79.8	80.0	80.0	80.5	80.6	80.2	79.4	77.4	78.8
Highest	10	88	91	91	91	91	91	90	91	93	92	92	89	93
Lowest	10	59	60	61	63	68	68	69	69	68	65	66	62	59
Relative humidity														
Mean, 6 a., 10 a., 4 p.	14	80	78	76	76	78	80	81	81	82	83	83	82	80
Cloudiness														
Mean, 3 observations	10	6.0	6.2	6.0	6.5	6.8	7.0	6.9	6.4	6.4	6.3	5.8	5.5	6.3
Precipitation														
Mean	31	4.68	4.25	2.91	3.90	4.68	7.44	9.37	10.31	9.25	9.64	7.87	5.91	80.21
Days with rain	15	19	14	16	14	16	21	22	22	20	19	20	19	222
Wind														
Prevailing direction, 3 observations	15	ne.	ne.	e.	e.	e.	e.	e.	e.	ne.	n.	n.	n.	e.
Days with gales	20	0	0	(a)	0	0	0	0	0	0	(a)	0	0	0.1
Days with fog	20	0.5	0.7	0.4	0.0	0.1	0.0	0.0	0.1	0.1	0.5	0.1	0.1	2.6

[a] Totals for 20-year period are: March, 1; October, 1.

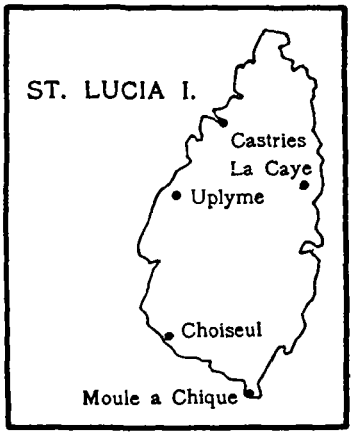
TABLE 48.—*Morne des Cadets, Martinique*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	9	77.9	78.1	79.7	80.6	82.0	81.1	81.5	82.8	83.7	83.1	81.7	79.2	81.0
Mean minimum	9	64.4	64.0	64.4	65.7	67.6	68.4	68.5	69.1	69.3	69.1	68.2	66.4	67.1
Mean	9	71.2	71.0	72.0	73.2	74.8	74.8	75.0	76.0	76.5	76.1	75.0	72.8	74.0
Highest	9	86	84	88	88	88	88	87	88	90	88	88	87	90
Lowest	9	59	60	61	62	64	64	65	66	65	64	65	63	59
Relative humidity														
Mean, 6 a., 10 a., 4 p.	9	77	76	74	75	75	77	77	77	77	77	78	78	76
Cloudiness														
Mean, 3 observations	9	5.7	5.7	5.7	6.1	6.1	6.8	5.8	5.9	5.7	6.0	5.7	5.9	5.9
Precipitation														
Mean	9	9.68	6.49	6.79	6.93	6.29	11.59	13.48	15.24	11.11	9.95	10.57	12.07	120.19
Days with rain	9	25	22	24	21	21	26	27	27	22	24	24	25	288
Wind														
Prevailing direction, 3 observations	9	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.

TABLE 49.—*Mean precipitation (in inches), Martinique*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Bassepoint	3	2.93	1.43	3.58	3.15	2.45	3.01	8.25	6.69	11.87	7.10	6.51	9.36	66.33
Fort de France [a]	31	4.68	4.25	2.91	3.90	4.68	7.44	9.37	10.31	9.25	9.64	7.87	5.91	80.21
Fort de France [b]	24	4.54	2.83	3.51	2.94	6.94	7.51	8.89	9.54	9.66	8.16	8.78	6.61	79.91
Fort de France [c]	3	2.16	2.35	2.69	2.31	1.92	3.21	7.59	7.11	10.17	5.56	5.61	5.48	56.16
Marin	3	1.48	1.73	2.56	2.30	0.91	0.81	7.17	3.73	7.86	4.53	4.70	7.65	45.43
Morne des Cadets	9	9.68	6.49	6.79	6.93	6.29	11.59	13.48	15.24	11.11	9.95	10.57	12.07	120.19
Robert	3	1.46	2.24	1.78	2.20	1.48	3.01	5.69	4.92	8.95	5.04	5.55	8.98	51.30
St. Pierre [d]	41	5.01	4.14	4.16	3.85	6.60	9.74	12.11	13.73	10.57	9.15	8.96	7.62	95.64

[a] Broken series. 1834–1870. Monthly record given by Raulin in *Actes de L'Académie national des sciences, belles-lettres et arts de Bordeaux volume 36. 1874.*
[b] 1891–1914. *Annales du Bureau Central Météorologique de France.*
[c] 1921–1923.
[d] 1830–1870. (Raulin.)



ST. LUCIA

Temperatures on this island are given by the records of two stations at Castries. Observations are available for the botanical station (14° 1′ N., 61° 0′ W., elevation 10 feet) and for the Weather Bureau stations near by (elevations 319 and 50 feet). On account of the considerable difference in elevation, data are given for the lowest and highest levels.

Again we find the characteristic difference in amount of precipitation due to the rugged outlines common to so many of the West Indian Islands. From a rather large number of stations five have been chosen to represent conditions in the different parts of the island.

The mean annual precipitation ranges from 50 inches at Moule a Chique to 130 inches at Uplyme. Following the relatively dry season from February to April, there is a gradual increase in rainfall to a maximum from July to October.

TABLE 50.—*Castries (Botanical Station), St. Lucia*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	7	82.3	82.6	84.2	85.3	86.5	86.5	86.8	87.4	87.9	86.5	85.1	83.1	85.4
Mean minimum	7	69.0	69.0	69.7	70.9	73.1	74.2	74.1	73.9	73.3	72.6	72.0	70.9	71.9
Mean	7	75.6	75.8	77.0	78.1	79.8	80.4	80.4	80.6	80.6	79.6	78.6	77.0	78.6
Highest	7	86	87	90	90	91	92	90	92	92	92	90	89	92
Lowest	7	62	60	62	62	66	67	69	68	68	68	67	63	60
Relative humidity														
Mean, 7 a., 3 p.	5	79	76	77	77	78	80	78	80	82	81	83	82	79
Precipitation														
Mean	34	5.68	3.89	4.12	4.01	6.88	8.98	9.73	10.45	9.73	10.28	9.29	7.96	91.00
Maximum in 24 hours	11	3.16	4.23	1.91	3.85	4.03	3.90	2.52	6.92	*13.18	2.86	4.01	4.60	*13.18
Days with rain	11	22	18	19	17	19	25	26	25	22	23	22	23	261

*Gage overflowed.

TABLE 51.—*Castries (U. S. Weather Bureau), St. Lucia*

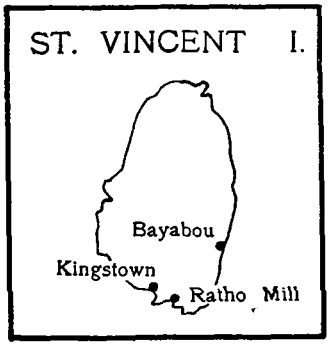
	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	4	81.3	82.2	82.3	84.9	85.4	85.3	85.2	86.0	86.9	86.7	85.9	83.1	84.6
Mean minimum	4	70.5	70.4	70.0	71.0	73.0	74.0	73.7	73.9	73.8	73.4	72.9	71.2	72.3
Mean	4	75.9	76.3	76.2	78.0	79.2	79.6	79.4	80.0	80.4	80.0	79.4	77.2	78.5
Highest	4	87	86	87	90	93	90	90	92	92	91	91	89	93
Lowest	4	66	67	66	68	69	70	68	70	68	68	68	67	66
Precipitation														
Mean	6	5.83	4.62	5.20	3.74	5.30	6.68	9.86	9.73	9.13	8.21	7.29	8.37	83.96
Maximum in 24 hours	6	1.91	1.98	1.78	3.75	2.34	1.61	4.76	2.41	2.98	5.23	1.65	4.97	4.97
Days with rain	6	22	20	22	18	19	26	26	25	24	23	20	22	267
Wind														
Prevailing direction	4	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.

TABLE 52.—*Mean precipitation (in inches), St. Lucia*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Castries (B. S.)	34	5.68	3.89	4.12	4.01	6.88	8.98	9.73	10.45	9.73	10.28	9.29	7.96	91.00
Castries (W. B.)	6	5.83	4.62	5.20	3.74	5.30	6.68	9.86	9.73	9.13	8.21	7.29	8.37	83.96
Choiseul	7	3.45	2.01	2.98	2.05	3.17	5.79	8.17	8.08	7.78	9.05	7.48	4.03	64.04
La Caye	10	4.18	3.72	3.26	4.11	4.04	6.77	6.99	7.23	8.49	9.92	7.54	6.43	72.68
Moule a Chique	10	2.85	1.55	2.01	2.30	2.26	4.21	4.86	6.18	5.64	6.58	6.16	4.18	48.78
Uplyme	10	7.69	7.30	6.68	6.30	8.61	11.75	15.00	13.66	13.23	14.85	13.68	11.20	129.95

ST. VINCENT

The series of observations at the experiment station near Kingstown (13° 9′ N., 61° 14′ W., elevation 80 feet) for the period 1909–1921 is the only source of information relative to meteorological conditions prevailing on the island in recent years. Precipitation means based on early records are available for Kingstown; Ratho Mill, near the southern extremity of the island; and Bayabou, on the eastern coast.



In this latitude we find that the difference in mean temperatures of the warmest and coldest months is very small; the extremes of monthly means are 81° in September and 77° in January and March. In a period of nine years maximum readings of 90° or above were observed only in the months of September and October; minima of about 65° occurred in January and February.

The mean annual precipitation is 70 to 90 inches in the southern part of the island; no data are available for other regions. The precipitation from June to November is much heavier than that during the remainder of the year.

TABLE 53.—*Kingstown (Experiment Station), St. Vincent*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	3	82.4	81.8	82.1	83.1	83.8	83.8	84.4	85.1	85.8	85.1	84.5	83.1	83.8
Mean minimum	3	71.6	72.8	72.0	73.9	74.7	75.6	75.8	76.5	76.2	75.1	73.8	72.4	74.2
Mean	3	77.0	77.3	77.0	78.5	79.2	79.7	80.1	80.8	81.0	80.1	79.2	77.8	79.0
Highest	9	86	85	89	88	87	87	89	88	90	91	87	87	91
Lowest	9	65	64	66	68	71	71	71	72	71	72	69	67	64
Relative humidity														
Mean, 9 a., 3 p.	5	68	70	66	66	69	72	73	72	72	72	73	70	70
Precipitation														
Mean	11	5.42	4.00	3.59	4.08	4.52	8.68	9.42	10.68	10.06	11.97	12.60	5.78	90.80
Maximum in 24 hours	9	2.03	3.34	1.38	2.29	2.28	3.02	2.07	3.61	4.42	5.17	6.88	1.67	6.88
Days with rain	9	22	20	19	16	19	25	26	26	23	25	24	22	2.67

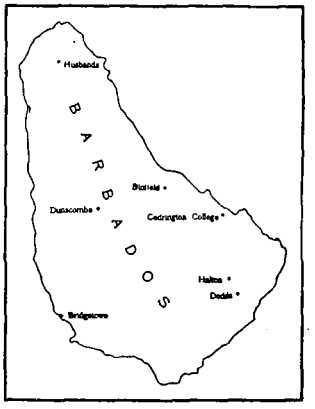
TABLE 54.—*Mean precipitation (in inches), St. Vincent*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Bayabou [a]	6	2.36	2.00	2.84	1.70	6.36	7.61	7.39	6.75	10.08	9.12	8.90	4.45	69.56
Kingstown (1913–1923)	11	5.42	4.00	5.59	4.08	4.52	8.68	9.42	10.68	10.06	11.97	12.60	5.78	90.80
Kingstown (old records) [a]	23	5.08	2.68	2.95	2.91	5.98	9.09	9.09	8.07	8.50	8.86	9.69	5.75	78.65
Ratho Mill [a]	13	5.71	2.17	3.03	2.80	5.87	8.46	8.50	6.77	10.79	9.25	11.38	6.81	81.54

[a] *Die Verteilung des Niederschlags auf der festen Erdoberfläche*, Supan.

BARBADOS

Early records for stations in the vicinity of Bridgetown for the periods 1853–1862 and 1865–1886 appear in Meteorological Observations at Foreign and Colonial Stations of the Royal Engineers and the Army Medical Department, No. 83, London Meteorological Office. In a report on the rainfall of Barbados in 1847–1871 Rawson gives records for three stations in the eastern half of the island. The series of observations at Dodd's Station, in the southeast, began in 1891(?) and that for the present Government Meteorological Station at Codrington House,



near Bridgetown, in July, 1902. The records of the U. S. Weather Bureau cover the periods September, 1898–October, 1903 (Bridgetown) and from September, 1917, to date (Worthing, 3 miles southeast of Bridgetown).

Summaries are given here for Codrington House (13° 8′ N., 59° 36′ W., elevation 181 feet), and for the Weather Bureau station (13° 6′ N., 59° 37′ W., elevation 30 feet) in Bridgetown.

Temperature.—The mean annual temperature for this region, based on observations at the two stations, is about 79°; near sea level monthly means range from 81° in August and September to 78° in January–March; at the 180-foot level the march is practically the same, with values rather uniformly 1° lower. The highest observed temperatures barely exceed 90°, while the lowest are 65° to about 60°, according to elevation.

Precipitation.—The records for the period 1891–1908 furnish the best series to represent comparative amounts of rainfall received in different sections of the island. The mean annual amounts are as follows: Fifty-five inches on the southwestern coast (Bridgetown), 60 inches in the north (Husbands), on the eastern coast (Codrington College), and in the southern interior (Dodds), and 86 inches in the central elevated region (Dunscombe). In the march of precipitation all stations show the minimum in February, a continuous increase to the maximum in September, and generally a secondary maximum in November.

Owing to many changes in the location of the point of observation in or near Bridgetown, precipitation means for the different series are not combined. Footnotes under table of precipitation means will furnish information for comparison of conditions in earlier and later years.

TABLE 55.—*Bridgetown (Codrington House), Barbados*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	10	82.9	83.3	84.0	85.4	86.7	86.4	86.1	86.2	86.0	85.5	84.6	83.4	85.0
Mean minimum	10	69.7	69.7	70.0	71.5	73.3	74.2	73.8	73.9	73.7	73.1	72.7	71.1	72.2
Mean	10	76.3	76.5	77.0	78.4	80.0	80.3	80.0	80.0	79.8	79.3	78.6	77.2	78.6
Highest	18	86	87	88	90	90	89	89	91	90	89	88	87	91
Lowest	18	61	61	62	64	66	66	68	68	67	68	67	64	61
Relative humidity														
Mean, 9 a., 3 p	10	65	63	60	60	61	65	66	67	70	70	71	68	66
Cloudiness														
Mean, 2 observations	8	7.1	7.0	7.0	7.3	7.4	7.6	7.4	7.2	7.4	7.5	7.3	7.1	7.3
Precipitation														
Mean	19	2.06	1.70	1.64	1.67	1.82	4.36	4.84	6.81	6.60	6.03	4.58	3.47	45.58
Maximum in 24 hours	7	1.38	0.89	1.64	2.56	1.14	1.99	3.17	3.76	4.65	4.45	2.36	2.49	4.65
Days with rain	19	13	12	11	8	10	16	18	17	16	17	15	15	168
Wind														
Prevailing direction	8	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.
Mean hourly velocity	8	12.5	13.5	12.4	12.4	12.8	13.5	12.4	9.8	8.1	7.5	8.4	10.6	11.2
Days with gales	23	0	0	0	0	0	0	0	0	(a)	0	0	0	0
Days with fog	23	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Total number for the period of 23 years; September, 1.

TABLE 56.—*Bridgetown (U. S. Weather Bureau), Barbados*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	5	83.6	83.5	83.8	85.1	85.9	86.0	86.0	86.7	86.7	86.3	85.8	84.6	85.3
Mean minimum	5	72.1	71.7	72.1	73.2	75.0	75.3	75.2	75.2	75.1	74.5	74.7	73.0	73.9
Mean	5	77.8	77.6	78.0	79.2	80.4	80.6	80.6	81.0	80.9	80.4	80.2	78.8	79.6
Highest	5	86	86	87	88	88	89	88	90	90	90	88	87	90
Lowest	5	68	67	67	68	69	71	70	70	69	65	68	68	65
Relative humidity														
Mean, 8 a., 8 p	5	77	75	74	73	75	78	80	80	79	80	79	78	77
Cloudiness														
Mean	5	5.0	5.3	5.4	5.5	5.8	6.7	6.0	6.0	6.0	6.1	6.0	5.6	5.8
Precipitation														
Mean [b]	11	1.69	1.30	1.28	1.07	1.90	3.67	5.04	6.82	6.85	5.30	4.20	2.99	42.11
Days with rain [b]	11	16	12	11	9	11	16	19	18	14	16	14	15	171
Wind														
Prevailing direction	5	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.	e.
Mean hourly velocity	5	8.6	9.3	8.9	9.0	9.5	9.6	8.5	7.7	7.1	6.7	7.7	7.6	8.4
Maximum velocity	5	28	27	25	24	28	28	36	52	*62	33	28	25	62
Direction at maximum	----	e.	e.	e.	se.	se.	se.	e.	s.	ne.	sw.	se.	e.	ne.

[b] Sept. 10, 1898.
[b] Record for Worthing for 1917–1924 combined with that for Bridgetown.

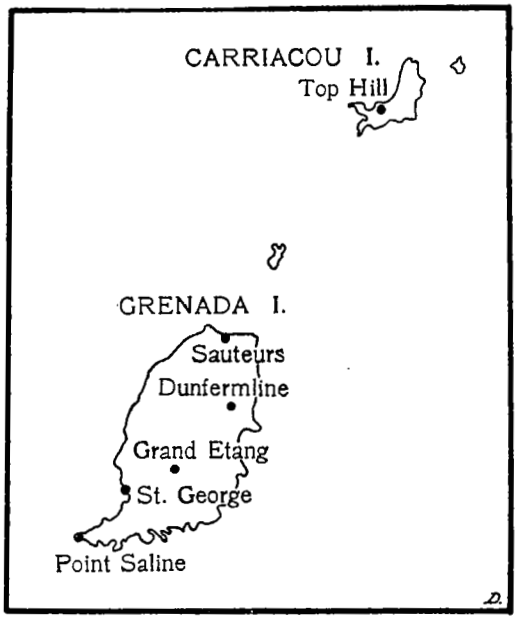
TABLE 57.—*Mean precipitation (in inches), Barbados*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Binfield	18	3.74	3.20	1.76	2.51	3.71	6.34	6.58	7.97	7.88	9.47	8.03	5.24	66.43
Bridgetown I	31	2.70	1.75	1.25	1.23	3.03	4.86	5.05	6.44	6.90	7.60	6.22	3.09	50.12
Bridgetown II	17	2.87	1.54	1.98	2.01	2.76	5.26	5.69	7.42	7.98	6.30	6.81	4.33	54.95
Bridgetown III	19	2.06	1.70	1.64	1.67	1.82	4.36	4.84	6.81	6.60	6.03	4.58	3.47	45.58
Bridgetown IV	11	1.69	1.30	1.28	1.07	1.90	3.67	5.04	6.82	6.85	5.30	4.20	2.99	42.11
Codrington College	16	3.34	1.59	2.51	3.10	3.42	6.03	6.71	7.28	8.04	6.08	7.85	5.22	61.17
Dodds	17	3.13	1.67	2.50	2.80	2.87	5.75	6.05	7.25	7.74	6.53	6.65	5.75	58.69
Dunscombe	17	5.01	2.96	4.17	3.59	4.71	8.85	9.30	9.86	11.52	8.91	9.69	7.35	85.92
Halton	18	2.96	2.40	1.48	2.07	3.23	5.17	5.14	7.15	5.99	8.65	6.72	4.62	55.58
Husbands I	18	2.63	2.27	1.07	1.82	3.23	5.14	5.73	7.48	6.68	8.89	7.33	4.08	56.35
Husbands II	13	3.04	1.57	1.92	2.76	3.63	5.27	7.16	7.02	8.29	6.54	5.75	5.23	58.18

NOTE.—Binfield, central interior, 1,064 feet, 1854–1871; Bridgetown I., different elevations, 1853–1862 and 1865–1886; Bridgetown II. (Central Police Station and Government House), 1890–1908; Bridgetown III. (Codrington House), 181 feet, 1903–1923; Bridgetown IV. (U. S. Weather Bureau), 30 feet, 1898–1903 and 1917–1924; Codrington College, east coast, 1891–1908; Dodds, southeastern interior, 210 feet, 1891–1908; Dunscombe central interior, 850 feet, 1891–1908; Halton, near Dodds; 280 feet, 1854–1871; Husbands I, northern region, 184 feet, 1854–1871; Husbands II., 1895–1908.

GRENADA

Meteorological conditions at moderate elevation are given in the table for Richmond Hill, near St. George, on the southern leeward coast (12° 31′ N., 61° 45′ W elevation 509 feet).



In the southern part of this island we find another instance of marked change in amount of rainfall received at points within a very small area. At Point Saline, the southwestern extremity, the mean annual precipitation is only 39 inches; at Richmond Hill, a few miles to the north, it is 77 inches, while at Grand Etang (elevation, 1,740 feet), near the center of the island, it increases to 147 inches. At Sauteurs, on the northern coast, and Dunfermline, just inland from the eastern coast, the means of annual rainfall are 60 and 70 inches, respectively. In the relatively dry months of February and March the mean monthly rainfall in the extreme south is about 1 inch; in the period of maximum fall, July and August, monthly totals for the island range from 6 to 15 inches.

TABLE 58.—*St. George (Richmond Hill), Grenada*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	12	82.1	82.4	82.8	84.3	84.7	83.9	84.0	85.0	85.5	85.2	84.0	83.2	83.9
Mean minimum	12	72.1	72.0	72.2	73.7	74.6	74.5	75.0	74.4	75.2	75.2	74.4	73.3	73.9
Mean	12	77.1	77.2	77.5	79.0	79.6	79.2	79.5	79.7	80.4	80.2	79.2	78.2	78.9
Highest	12	88	89	90	89	90	89	90	91	93	92	90	88	93
Lowest	12	69	68	68	69	69	70	70	69	70	70	70	68	68
Relative humidity														
Mean, 9 a., 6 p	12	75	73	71	72	74	77	77	77	77	79	78	76	76
Cloudiness														
Mean 2 observations	12	3.4	3.2	3.2	3.8	4.5	5.2	4.4	4.5	3.9	4.1	4.1	3.7	4.0
Precipitation														
Mean	30	4.45	2.83	2.82	2.24	4.58	8.35	9.80	9.70	8.26	7.77	8.42	7.44	76.56
Maximum in 24 hours	12	1.82	1.40	1.22	1.30	3.50	2.90	3.70	3.45	3.90	4.35	4.30	2.90	4.35
Days with rain	12	18	13	13	11	14	21	22	21	18	17	20	18	206
Days with thunderstorm	12	(a)	(a)	0	(a)	(a)	1	1	3	3	2	1	(a)	12
Days with gales	28	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3
Days with fog	28	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Totals for 12-year period; January, 1; February, 1; April, 2; May, 1; December, 2.

TABLE 59.—*Mean precipitation (in inches), Grenada*

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Dunfermline	7	3.67	2.26	2.13	3.38	3.7:	..01	9.00	8.94	7.64	7.92	8.90	5.22	69.83
Grand Etang	10	8.35	6.49	7.77	7.21	10.12	14.10	15.93	15.34	15.23	15.50	16.89	13.97	146.90
Point Saline	10	1.67	0.82	1.10	0.39	1.44	4.57	5.71	6.35	4.66	4.30	4.86	3.12	38.99
Richmond Hill	30	4.45	2.83	2.82	2.24	4.58	8.35	9.80	9.70	8.26	7.77	8.42	7.44	76.56
Sauteurs	11	3.06	2.43	2.46	[a]1.38	3.19	5.98	8.29	7.64	6.51	6.64	8.02	4.87	60.47
Top Hill, Carriacou Is	10	2.31	1.80	1.71	1.71	2.97	5.01	6.71	6.69	5.10	5.69	5.91	3.85	49.46

[a] 24.17 inches in April, 1915, not included.

TOBAGO

The short, broken series of temperature records for Pembroke and The Park (1891–1893) found in the meteorological returns for Trinidad are not summarized. The means of precipitation show a considerable range in the amount of rain received in different sections of the island.

TABLE 60.—*Mean precipitation (in inches), Tobago*

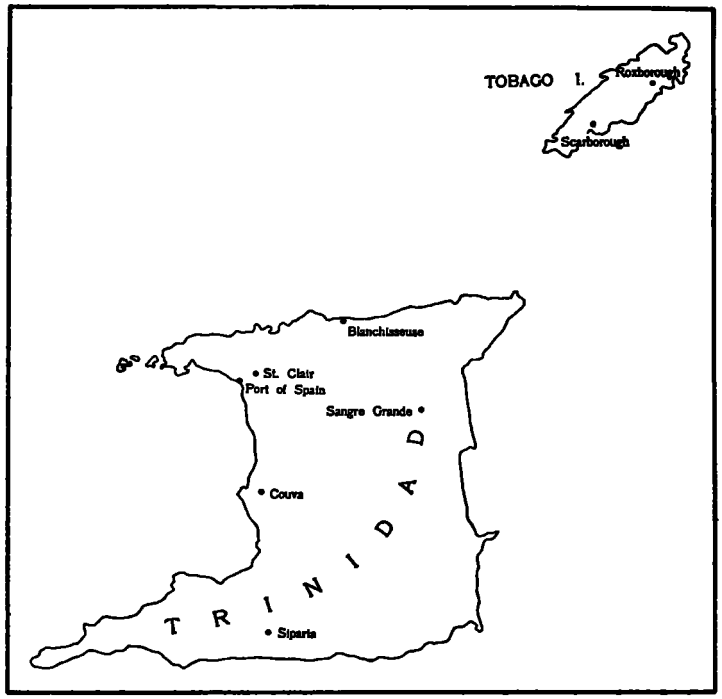
Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Botanic Station	23	3.20	1.83	1.95	1.97	5.00	8.79	9.20	9.03	8.21	8.43	7.58	6.43	71.62
Government Farm [a]	13	1.69	1.19	0.90	1.09	2.62	5.68	6.19	5.94	5.46	6.22	6.11	3.85	46.04
Roxborough Estate [a]	12	5.81	3.92	3.71	3.01	5.40	9.75	10.52	9.37	10.32	11.19	9.42	8.68	91.10

[a] Near Scarborough.

TRINIDAD

Climatic tables are given for three closely adjacent stations in or near Port of Spain, in the northwestern part of the island: Botanical Gardens, St. Clair Experiment Station, and the Weather Bureau station. (See footnotes to tables for geographic coordinates and elevations.)

Temperature.—The mean annual temperature rises from 78° at St. Clair to 79° at the botanical gardens and to 80° in the city of Port of Spain. In contrast to the annual march in temperature noted for the regions previously considered we find here two maxima—one in May and another in September or October; the secondary minimum in July or August is very slightly marked, but appears in the values at all stations. The difference between the highest and lowest monthly mean temperatures is only 3°. St. Clair shows an extreme temperature range of 45° (101° and 56°), which is considerably greater than that found at any other station in the southern part of the West Indian region.



Precipitation.—In the vicinity of Port of Spain the mean annual precipitation is about 60 inches and the same amount is received along the middle of the western coast; at Siparia, near the southern coast, and at Blanchisseuse, on the northern coast, there is an increase to about 85 inches, and at Sangre Grande, a few miles from the mid-eastern coast, a further increase to 112 inches. The rainfall is least in February, when the mean amount falls to 1.50 inches or less in the drier regions, and it is greatest in July or August, when the means range from about 8 inches at Port of Spain to 13 inches at Sangre Grande.

In the MONTHLY WEATHER REVIEW for February, 1925, P. E. James contributes an interesting paper on the climate of Trinidad.

TABLE 61.—*Port of Spain* (Botanical Gardens), Trinidad*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	9	86.1	86.4	87.2	88.7	90.6	88.3	88.0	88.6	88.8	89.0	87.4	86.8	88.0
Mean minimum	9	67.5	67.1	67.8	68.3	70.6	70.5	70.6	71.0	71.1	70.8	70.6	69.4	69.6
Mean	9	76.5	76.8	77.5	78.5	80.6	79.4	79.3	79.8	80.0	79.9	79.0	78.1	78.8
Highest	9	92	95	95	94	95	97	97	93	93	93	92	91	97
Lowest	9	61	62	60	62	63	66	63	65	67	66	63	60	60
Relative humidity														
Mean, 7 a., 3 p	9	80	76	75	74	75	79	81	83	82	82	83	81	79
Precipitation														
Mean	9	3.11	1.59	1.79	2.32	4.38	8.42	8.71	9.03	6.61	7.22	8.75	4.93	66.86
Maximum in 24 hours	9	4.00	1.72	1.18	1.86	2.44	3.75	2.51	3.17	2.80	5.90	3.10	2.53	5.90
Days with rain	9	14	11	10	9	12	19	21	22	15	15	19	15	182

* 10° 40′ N., 61° 26′ W.: elevation, 130 feet.

TABLE 62.—*Port of Spain* (St. Clair), Trinidad*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	20	84.7	85.6	86.2	88.0	88.2	85.7	86.2	85.4	86.3	86.7	86.1	85.3	86.2
Mean minimum	20	66.9	67.0	66.6	68.2	69.9	70.2	69.8	70.3	69.9	70.5	70.3	68.9	69.0
Mean	20	75.8	76.3	76.4	78.1	79.0	78.0	78.0	77.8	78.1	78.6	78.2	77.1	77.6
Highest	20	92	93	99	99	98	96	97	97	101	93	95	97	101
Lowest	20	57	60	60	60	57	60	61	61	56	61	61	61	56
Relative humidity														
Mean, 7 a., 3 p	14	81	78	80	76	76	80	82	84	82	83	81	83	80
Sunshine														
Mean daily duration, hours	8	6.6	7.7	7.0	6.7	6.6	6.1	5.9	5.8	5.5	6.1	6.7	6.7	6.4
Precipitation														
Mean	21	2.29	1.25	1.77	1.35	3.11	7.29	8.41	8.58	7.69	6.33	6.57	4.47	59.11
Maximum in 24 hours	18	1.82	1.48	1.51	2.48	2.33	2.60	2.50	2.66	2.92	3.16	2.21	1.82	3.16
Days with rain	20	10	8	9	6	11	18	20	21	16	16	16	14	165
Wind														
Prevailing direction	10	ne.	ne	ne.	ne.	ne.	ne.	ne.	ne.	ne.	ne.	ne.	ne.	ne.

* 10° 40′ N., 61° 31′ W.; elevation, 67 feet.

TABLE 63.—*Port of Spain (U. S. Weather Bureau),* Trinidad*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	8	85.3	85.6	86.1	87.1	87.6	86.8	86.4	87.2	87.8	87.4	86.7	85.7	86.6
Mean minimum	8	70.9	70.8	71.2	72.2	73.4	73.2	73.0	73.1	73.7	73.2	72.9	71.9	72.5
Mean	8	78.1	78.2	78.6	79.6	80.5	80.0	79.7	80.2	80.8	80.3	79.8	78.8	79.6
Highest	11	89	90	90	95	92	92	91	92	93	92	92	90	95
Lowest	11	66	66	66	66	69	69	70	66	68	70	69	67	66
Relative humidity														
Mean, 8 a., 8 p	3	77	74	74	73	74	81	80	82	79	79	80	79	78
Cloudiness														
Mean	3	5.6	5.0	6.5	5.6	5.9	7.0	6.4	6.6	6.3	6.5	6.3	6.2	6.2
Precipitation														
Mean	12	2.26	1.13	1.80	1.19	2.50	6.74	7.88	7.41	6.44	5.62	6.52	4.50	53.99
Maximum in 24 hours	8	2.67	0.71	0.88	2.36	0.92	1.97	2.73	2.10	2.80	2.35	1.82	2.00	2.80
Days with rain	10	13	9	11	6	10	18	21	20	17	16	20	17	178

* 10° 39′ N., 61° 31′ W.; elevation, 40 feet.

TABLE 64.—*Mean precipitation (in inches), Trinidad*

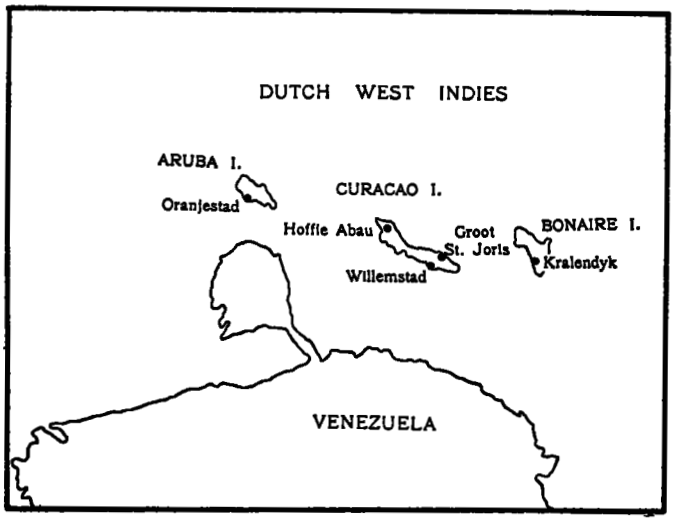
	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Blanchisseuse	29	6.99	4.14	4.22	3.26	5.66	10.55	11.41	9.52	6.21	6.07	8.54	9.09	85.66
Couva	28	2.76	1.35	1.66	1.96	3.92	8.12	8.31	9.21	6.88	6.21	6.42	5.10	61.90
Port of Spain I	26	2.23	1.12	1.38	1.41	3.50	7.44	7.65	8.42	6.07	6.26	6.55	4.38	56.41
Port of Spain II	12	2.26	1.13	1.80	1.19	2.50	6.74	7.88	7.41	6.44	5.62	6.52	4.50	53.99
Sangre Grande	27	7.32	4.08	4.67	4.20	8.43	11.75	13.99	12.55	8.71	9.43	13.26	11.53	111.92
St. Clair I	21	2.29	1.25	1.77	1.35	3.11	7.29	8.41	8.58	7.69	6.33	6.57	4.47	59.11
St. Clair II	60	2.74	1.51	1.87	1.88	3.60	7.97	8.91	9.64	7.41	6.64	7.02	4.68	63.87
Siparia	28	4.32	2.63	3.14	2.88	5.56	10.26	11.80	10.15	6.83	7.54	9.90	8.23	88.24

NOTE.—Port of Spain I, Central Police Station, 1891–1919; Port of Spain II, Weather Bureau, 1898–1900 and 1915–1924; St. Clair I, 1901–1921; St. Clair II, records for two adjacent stations (see text), 1862–1921.

DUTCH WEST INDIES (SOUTHERN GROUP) [1]

Meteorological conditions in this region are represented by the climatic data given for Willemstad, Curacao (12° 6′ N., 68° 56′ W.; elevation, 75 feet).

The mean annual temperature of 81° at Willemstad is the highest known for the entire West Indian region; this is due to the high value of the mean minimum—77° compared with 74° at Bridgetown and 72° at Port of Spain. The maximum in the annual march of temperature occurs in September (83°) and the minimum in the period December–March (79°). The observed temperature extremes are 94° and 67°.



The mean annual rainfall in this region is very light. Hoffie Abau, near the western end of Curacao, receives on an average only 27 inches; in the eastern part of the island there is a decrease to 23 inches at Willemstad, on the southern, and to 21 inches at Groot St. Joris, on the northern coast. The annual mean of 17 inches at Oranjestad, on the island of Aruba, just west of Curacao, is the lowest found in the West Indian region.

From October to January the rainfall in Curacao and vicinity is moderately heavy, generally from nearly 3 to more than 4 inches; during the remainder of the year it is very light, with means for May decreasing to 0.50 inch or less.

[1] Southern islands off the coast of Venezuela. Data for the northern islands, St. Martin, Saba, and St. Eustatius, are given under the heading Northern Leeward Islands.

TABLE 65.—*Willemstad, Curacao**

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	15	83.1	83.5	83.5	85.1	86.0	86.9	86.7	87.3	87.8	86.9	85.6	83.4	85.5
Mean minimum	15	74.5	74.5	74.5	76.3	77.7	78.1	77.7	77.7	78.3	77.7	76.6	75.2	76.6
Mean	15	78.8	79.0	79.0	80.7	81.8	82.5	82.2	82.5	83.0	82.3	81.1	79.3	81.0
Highest	15	85	87	86	92	90	93	90	91	94	91	90	89	94
Lowest	15	68	68	67	70	73	72	72	71	70	70	70	69	67
Relative humidity														
Mean, 8 a., 2 p., 6 p., (?)	15	77	75	76	76	77	77	78	78	78	78	79	79	77
Cloudiness														
Mean, 3 observations	15	4.7	4.9	4.4	4.9	4.5	4.7	4.4	4.1	4.4	4.8	4.9	4.8	4.6
Precipitation														
Mean	70	2.07	0.95	0.84	1.07	0.76	0.95	1.47	1.22	1.12	4.20	4.43	3.85	22.93

* Data from the *Encyclopaedia van Nederlandsch West Indie.*

TABLE 66.—*Mean precipitation (in inches), Dutch West Indies**

Stations	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Curacao														
Groot St. Joris	17	2.07	1.54	0.85	1.16	0.47	0.63	0.98	0.89	0.95	4.02	4.79	3.05	21.40
Hoffie Abau	13	3.61	2.08	1.13	0.87	0.36	0.85	1.11	1.10	1.76	4.72	5.86	3.37	26.84
Willemstad	70	2.07	0.95	0.84	1.07	0.76	0.95	1.47	1.22	1.12	4.20	4.43	3.85	22.93
Bonaire														
Kralendyk	20	2.28	1.15	0.71	0.65	0.52	0.57	1.13	1.03	1.04	3.10	4.14	3.53	19.95
Aruba														
Oranjestad	24	2.01	0.58	0.66	0.64	0.38	0.53	0.97	1.03	1.28	2.92	3.43	2.98	17.41

* Data from *Meteorologische Waarnemingen, Suriname en Curacao.*

SWAN ISLAND

This small island lies in the western Caribbean Sea about 100 miles off the coast of Honduras (17° 24′ N., 83° 17′ W.; elevation, 35 feet).

The mean annual temperature (80.5°) is 1.5° higher than that for the eastern stations of Christiansted and Basseterre in the same latitude, and is very slightly lower than the high mean noted for Willemstad. The range in temperature is from 92° to 64°, practically the same as observed for the greater part of the West Indian region.

The mean annual rainfall is about the same as that near sea level on the islands of St. Croix, St. Kitts, and Antigua—51 inches.

TABLE 67.—*Swan Island*

	Length of record, years	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Temperature														
Mean maximum	8	82.9	83.4	85.0	86.3	87.6	86.3	87.0	87.8	87.7	86.8	85.0	83.9	85.8
Mean minimum	8	72.8	73.1	73.7	75.3	76.7	76.3	76.7	76.6	76.6	75.8	74.9	73.8	75.2
Mean	8	77.8	78.2	79.4	80.8	82.2	81.3	81.8	82.2	82.2	81.3	80.0	78.8	80.5
Highest	8	88	86	89	90	92	92	91	91	91	90	89	88	92
Lowest	8	64	66	67	68	68	70	70	70	70	70	70	69	64
Precipitation														
Mean	10	3.28	1.35	1.45	0.98	2.12	8.04	4.53	4.27	4.25	7.91	8.73	4.22	51.13
Maximum in 24 hours	10	2.80	1.03	2.54	1.97	3.08	4.90	4.86	3.01	3.32	4.42	5.54	4.10	5.54
Days with rain	10	12	8	6	4	7	16	12	13	13	17	16	15	139

PRECIPITATION VERSUS SNOW SURVEYS FOR PREDICTING STREAM DISCHARGE

551.577 : 551.578.46 :
627.41 (792)

By J. CECIL ALTER

[U. S. Weather Bureau, Salt Lake City, Utah]

[Read before Utah Academy of Sciences, Salt Lake City, Utah, Saturday, April 3, 1926]

This paper is the result of an inquiry as to the comparative value of precipitation records and snow surveys for predicting the flood-time discharge of Big Cottonwood Creek, one of the major sources of Salt Lake City's water supply. The inquiry has resulted rather decidedly in favor of precipitation records where they are available in proper numbers and places, though the snow survey shows a valuable correlation factor.

Big Cottonwood watershed, discharging into the Salt Lake valley about 12 miles southeast of Salt Lake City, is about 12 miles long and about 48.5 square miles in extent, its sharp crest lines being from 9,000 to 11,000 feet above the sea. Thus the watershed has appeared to be an excellent region for successful snow survey work. These have been made with encouraging results since 1912 by the Salt Lake City engineering and water works departments.

The results of a preliminary inquiry into the subject of precipitation vs. snow surveys were presented before this Academy a year ago. The surveys, as of the close of April, reduced to percentages of the mean for the period were compared with the stream discharge from May to August, inclusive, a period in which run-off averages about 40,000 acre feet or two-thirds of the annual discharge.

The difference between snow survey percentages (using the densities or water-content values) and stream discharge percentages averaged 13.4 per cent for the period 1912 to 1917 inclusive, utilizing from 60 to 100 measurements distributed fairly generally over the watershed. But for about 25 measurements in Brighton basin, 6.8 square miles in extent, at the head of the canyon, the survey figures differed from the discharges by an average of only 11.5 per cent from 1912 to 1924; while sets of readings in 6 selected places differed 12.5 per cent from the discharge figures; and measurements at only two of these places varied only 12.3 per cent from the discharges. Some of this variation is doubtless due to the differing lengths of the records. It was also shown that the simple snow depth values in Brighton Basin gave an average miss of only 13.3 per cent a somewhat surprising value in view of the general belief that snow densities vary greatly. They probably do not vary greatly at the end of April, by which time the texture of the snow layer has apparently become comparatively homogenous.

The coefficient of correlation for the values of best fit given above (11.5%) was found to be 0.841 plus or minus 0.055, a very good correlation.

A considerable effort has been made by various investigators to discover a relationship between precipitation and stream flow, on the basis of records at the several cooperative weather stations in the general neighborhood of the Cottonwood Canyons. Results have in general been only fair; whence the usual conclusion that the stations are not in correct positions to serve best as indicators, and possibly not numerous enough.